# Survey on Mobile Network Operators in P2P Applications

## Niranchana.D<sup>1</sup>, Venugopal.A<sup>2</sup>

 <sup>1</sup>Research Scholar, <sup>2</sup>Assistant Professor Computer Science
<sup>1</sup>Sree Narayana Guru College, Coimbatore, India.
<sup>2</sup>Sri Krishna Arts and Science College, Coimbatore, India.

*Abstract*: Increasing heterogeneity of networks, services and applications emphasizes the need for middleware as an essential part of the information technology infrastructure. To implement novel 3G and beyond 3G mobile applications and services, the light-weight middleware utilizing application super networking and hybrid peer-to-peer (P2P) – client/server concepts can be considered. Hybrid scenarios could include e.g. utilizing secure client/server –based authentication for P2P networks. PnPAP provides support for seamless usage of multiple simultaneous applications, protocols and network connectivity. Application interactions can benefit from middleware support for optimized access to the heterogeneous All-IP (TCP/IP) networks and IMS service platform.

*Index Terms*: Middleware, application collaboration, mobile peer-to-peer, application super networking, tethering, mobile computing, optical communication.

## I. INTRODUCTION

The Internet is a critical infrastructure that underpins many of the services that we have grown accustomed to in modern life. However, it is a constantly shifting and increasingly used asset. Considering the expenditure and lead time of upgrading of the constituent network components, it is important any existing resource is used efficiently for the greatest possible length of time. Despite recent advancements in security and protection, the network and services on it can still be vulnerable to attacks, with the threat of total outages as the result of a successful attack. Importantly attacks from inside of the network are often more threatening than remote ones, resulting in orders of magnitude greater cost when successful.

The invention relates generally to an optical communication system using a high altitude tethered balloon for high data rate communication between ground-based and space based or high altitude-based instrumentation. Many different techniques have been proposed to mitigate problems associated with atmospheric optical communications. One approach, when communicating from a ground station to an overhead satellite, is to have several ground stations at different locations so that a transmission can be sent from the ground station that is least obstructed by clouds. However such an approach likely requires more than three stations, separated by more than 200 km, to provide a reliable transmission capability. The costs associated with this approach are prohibitive.

If a packet is received during a brief "scintillation Window" that results in a clear line-of-sight between the transmitter and the receiver, an acknowledgement is returned to the transmitter. A subsequent packet of data is then repeatedly broadcast until it is received. However this approach is only able to establish communications through the atmosphere for very brief periods, thus high data rate communications are not optimized. Tethered balloons have been used for generations for long distance communications. Historically the balloons relayed information, often simply visual observations, from one point on the ground to another. Ground-to-aircraft and ground-to-spacecraft RF communications are also relayed using balloons. However viable groundto-spacecraft optical communications relayed via tethered balloons has not been suggested. Such balloon-relayed optical communications require overcoming the above mentioned problem of atmosphere-induced optical scatter and distortion.

## **II. BACKGROUND STUDY**

It is an object of the present invention to operate a high altitude tethered balloon that relays optical high data rate communications between space-based and ground-based instrumentation. Yet another object of the present invention is to reduce atmospheric disturbances affecting optical communications between space-based and ground-based instrumentation.

Fiber optics technology has matured as a method of data transport, allowing information exchange rates at terabit levels, and potentially beyond. However, in areas lacking fiber infrastructure, wireless technologies employing radio frequency and freespace laser links are the medium of choice for broadband wireless networking. In the wireless domain, and particularly in radio frequencies, propagation effects, atmospheric degradation, and environmental factors limit the maximum communication channel Speed/data rates, link performance, and availability. In particular, wireless optical links suffer degradation due to fog and other atmospheric conditions that severely attenuate the wireless Signal and block the transmission of light from link to link, while radio frequency links Suffer degradation due to rain and other particulate matter between links, as well as multipath effects caused by Signal reflection. In another embodiment of the present invention, each transmission channel has a transmit and receive Strength, and wherein the controller is configured to monitor the transmit and receive Strength of each channel; and the channels of the data to be transmitted through the laser portion and the radio frequency portion are determined by the controller based on their transmit and receive Strengths.

Recent advances in wireless communications have introduced higher capacity and better end-to-end quality of service (QoS) for various mobile networks. One form of potential abuse of wireless network services is excessive consumption of a wireless networks available bandwidth by using a mobile device as a wireless router for a set of other Internet-capable wireless devices, including: notebook computers, notebook computers, tablet PCs, etc. For instance, certain mobile operating systems, such as ANDROID, allow users to select an option to use a smart phone in a tethering mode. In the tethering mode the mobile device operates as a modem connecting a plurality of wireless data bandwidth consuming devices, such as laptops and tablets, to the Internet via the mobile device's data connection to a mobile (cellular) wireless data network. Such usage pattern, if unchecked, potentially places a heavy load on existing mobile networks. As a consequence, mobile network operators are faced with exponential and highly variable network traffic requiring increased capital expenditures to deal with new peak usage levels induced by the aforementioned tethering mode.

#### III. SUMMARY OF THE BACKGROUND STUDY

The node further incorporates a controller that is configured as a binary Switch Such that the data is transmitted exclusively through either one of the laser portion and the radio frequency portion. The mobile wireless system includes a mobile wireless device configured to Support networking a set of tethered devices by routing messages between the set of devices and the mobile wireless system. The mobile wireless device is further configured to perform the steps of receiving a message packet, the message packet having been issued from one of the set of tethered devices, and coloring the message packet to indicate that the message packet issued from one of the set of tethered devices. The mobile wireless system further includes an access gateway configured to perform the steps of receiving the message packet from the mobile wireless device, determining, in response to receiving the message packet from the mobile devices is associated, and discarding the message packet in response to determining from the profile that the mobile wireless device is not permitted to pass messages on behalf of tethered devices. Other objects and advantages of the invention will become more fully apparent from the following more detailed description and the appended drawings, wherein the reference numerals refer to like elements, that illustrate several embodiments of the invention. In the following description, the terms spacecraft, space-based instrumentation and satellite are interchangeable and refer to the various devices that may communicate with the high altitude balloon.

Service Oriented Architecture (SOA) paradigm is one of the recent advances in the middleware solutions that has mainly focused on enterprise servers, but has also been tested on mobile P2P. However, our middleware can take into consideration various e.g., context aware parameters even in a more flexible manner than in an SOA web-service based model. Mobile File Sharing Application (MFSA) is a mobile version of a typical P2P file sharing application. It provides basic functionalities such as sharing, searching and downloading content. Additionally, peer group management and instant messaging functionalities are provided, the first, however, requiring support from the underlying P2P protocol. MFSA itself includes only a user interface and an engine maintaining state information and communication interface to PnPAP. Illustrative embodiments, runs the ANDROID operating system that Supports the aforementioned tethering mode. The ANDROID operating system includes components that specifically Support the tethering mode. The present Subject disclosure is a tethering mobile device for establishing sponsored tethered connectivity. The tethering mobile device includes a processor, a memory in communication with the processor, a short-range wireless communication transceiver in communication with the processor, a long-range wireless communication transceiver in communication with the processor, and a tether logic on the memory, the tether logic for receiving an LFCS request from a special purpose connectivity device (SPCD) through the short-range wireless communication transceiver, verifying the validity of the SPCD, and establishing an LFCS connection between the SPCD and an application server controlled by a service provider. The service provider is billed for the LFCS connection. Tethering mobile devices communicate with each other and with other elements via a network, for instance, a wireless network, or a wire line network. Tethering mobile devices may have more than one transceiver, capable of communicating over different networks. For example, a cellular telephone can include a cellular transceiver for communicating with a cellular base station, a Wi-Fi transceiver for communicating with a Wi-Fi network, and a BLUETOOTHR) transceiver for communicating with a BLUETOOTHR) device. A network typically includes a plurality of elements that host logic for performing tasks on the network.

#### **IV. CONCLUSION**

PnPAP implements session management for super networked applications, and enables connecting users to multiple communities over heterogeneous distributed and centralized networks. Opportunities for community channel sharing is not limited to cellular links from spontaneously formed ad hoc groups of mobile devices but also in context of aggregating broadband access links (e.g., DSL) among neighboring residences. With the widespread adoption of 802.11 networks in home, neighboring residences can form collaborative communities to share and aggregate their broadband links. The concept is also extendable to context-aware and presence-oriented mobile applications. Advanced algorithmic and heuristic approaches related to the state-machines can be further considered.

# V. FUTURE ENHANCEMENT

For future work we are looking into the other factors that need to be considered for the winning bids. These include, total bytes the service is planning on using, minimum cost of renting an NFVI, and identifying service conflicts. The voice over Wi-Fi (VoWiFi) is attracting an impressive number of operators, willing to enjoy the various advantages provided with an efficiently invested cost. In the 5G technologies, still under standardization today, the edge computing technologies will be introduced to enhance the Network Function Virtualization (NFV) and cloud computing concepts. Many studies addressed the edge computing technology, but we did not find any research study that uses this technology to solve the VoWiFi limitations. Our proposal consists of introducing an application on the edge computing platform allowing the retrieval of location information related to VoWiFi users.

# VI. AUTHORS AND AFFILIATIONS

Niranchana.D<sup>1</sup>, Venugopal.A<sup>2</sup> <sup>1</sup>Research Scholar, <sup>2</sup>Assistant Professor <sup>1,2</sup>Computer Science <sup>1</sup>Sree Narayana Guru College, Coimbatore, India. <sup>2</sup>Sri Krishna Arts and Science College, Coimbatore, India.

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