THE ROLES OF NETWORK MAST IN INFORMATION PROVISION AND DISSEMINATION

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ABSTRACT

This study is a theoretical investigation of the roles of network mast in information provision and dissemination. The spread of the Internet has reached almost all parts of the world, and even in space, astronauts can read and send email messages. Information dissemination systems can either be client-server-based or peer-to-peer-based. Information is the most basic resource in today's society. Network masts, also known as "network towers," are typically tall structures designed to support antennas for telecommunications and broadcasting, including radio and television. The information can be related to news, multimedia files, service advertisements, environmental conditions, and local events such as the presence of an object. The improvements in technology have made these outlets increasingly popular and have become the main ways of distributing information because of the speed at which dissemination occurs. The study concluded that "information dissemination" is the distribution of information to the general public by an agency that is mandated to release information in any public sector. Information dissemination systems can either be client-server-based or peer-to-peer-based. One of the recommendations made was that the communication commission should encourage operators to subscribe to co-location, which allows operators to install their base receiver stations in the same telecommunication tower, reducing the number of masts and the cost of locating telecommunication base stations.

KEYWORDS: Roles, Network Mask, Information Provision and Dissemination

Introduction

Information is anything that influences our behavior, moods, beliefs, and interactions. Information is the most basic resource in today's society. For effective and efficient deployment, use, and growth of the networks, service providers must deploy, erect, and install in and around the country network masts, towers, and base stations to disseminate and disperse information and data services to end-users of these services. In a recent statement, Bashir Gwandu, the acting Executive Vice Chairman of the Nigerian Communications Commission (NCC), pointed out that "we cannot have communication services without putting network masts and towers around the country because we do not have infrastructure in place like other countries; we don't

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have fiber and wired lines across the country" (Edewor & Imhonopi, 2013). The provision and erection of these masts (towers) within the country, which are a sine qua non for the availability of communication services including the internet for fast-tracking business and government social services, is not without some issues and concerns from a wide range of quarters. According to the National Communication Commission (NCC, 2014), the global system for communication has dominated Nigerian society, as it accounts for about 98% of the market. The number of deployed transceiver base stations (BTSs) or mast sites grew from zero in 2001 to about 44,000 in May 2014 (Ekata & Kostanic, 2014). The use and deployment of mast structures around the world are phenomena; they have not only reduced the world into a global village but, more importantly into a global household (Olukolajo, Ezeokoli, & Ogungbenro 2013).

Information (data) dissemination is an important issue in networking since it is one of the ultimate goals of constructing networks. Here the information can be related to news, multimedia files, service advertisements, environmental conditions, and local events such as the presence of an object, etc. However, with the advance of modern technologies and the intricate connections between communication devices, attaining information dissemination control in such complicated networks has received tremendous attention in order to facilitate reliable and efficient communications (Chen, Cheng, & Chen, 2014). Modern communication networks are composed of several interdependent networks, including social networks and physical communication networks, where the nodes are connected by intermittent links (e.g., vehicular communication), delocalized links (e.g., email from your friends), and localized links (e.g., message from proximity).

Although modern technology benefits from diverse links, in the meantime, these time-varying and heterogeneous links unintentionally nurture the breeding of malware and incur a data deluge. Without adequate control, this redundant or undesired information may consume tremendous network resources, resulting in disastrous damage to network operations and incurring erroneous message delivery (Pajic, Sundaram, Pappas, & Mangharam, 2011). For instance, when disseminating emergent weather reports such as news of hurricanes and typhoons, one may want to come up with an information dissemination control scheme that is capable of updating imminent messages and deleting outdated messages in a timely manner. Since these messages are disseminated through various interfaces, e.g., televisions, the Internet, and instant messages, a reasonable model for describing information dissemination dynamics must be employed to evaluate and improve system performance.

Statement of the Problem

The rapid development boom recorded in the Nigerian telecommunications industry within the last two decades has led to the proliferation of telecommunications infrastructure across the country. This phenomenon is rampant and visible in all parts of the country, particularly in urban areas. The cityscape of the urban areas is distorted by mast towers and satellite dishes.

Concept of Network Mast

Network masts, also known as "network towers," are typically tall structures designed to support antennas for telecommunications and broadcasting, including radio and television. The terms "mast" and "tower" are often used interchangeably. However, in structural engineering terms, a tower is a self-supporting or cantilevered structure, while a mast is held up

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by stays, or guys (Wikipedia, 2022). Accordingly, Brazil Tower Company (2015) defined a mast as an antenna held up by stays or guy wires mounted onto another structure like a building or a tower. Typical masts are of steel lattice or tubular steel construction. There are two main types: guyed and self-supporting structures. They are among the tallest human-made structures. Masts are often named after the broadcasting organizations that originally built them or currently use them. In the case of a mast radiator or radiating tower, the whole mast or tower is itself the transmitting antenna.

Types of Masts or Towers

Monopoly Towers or Post Masts: Monopoly towers consist of tapered steel tubes that fit over each other to form a stable pole. A monopole tower should be guyed or self-supported and be fitted with climbing rungs where necessary. It should have the following features:

i. Sections should be made from hollow, heavy-duty, thick steel tubes, flanged steel tubes, or low-alloy, high-strength steel.

ii. Each shaft section should be a constant-tapered hollow steel section.

iii. Slip joints should be designed with a minimum of 1½ times the pole diameter at the splice.

iv. The pipe diameter should decrease from the bottom to the top.

v. Monopole are to be made from galvanized hollow steel pipes or high-strength steel and designed for a variety of multi-user configurations and finishes to meet local aesthetic requirements.

vi. The pipes shall be tapered to ensure that one pipe base fits into the top of another until the desired height is achieved. A joint in the arrangement should have an overlay between the two adjacent pipes.

vii. The depth of the overlay, the base width, and the number of pipes in a particular monopole shall be determined by the expected height of a tower, the thickness of the pipe walls, the base diameter, and whether the tower shall be guyed or not (Mohammed, 2019).

Guyed Towers: These are towers that are stabilized by tethered wires. The following specifications and recommendations apply:

i. Guyed masts may be in lattice, triangular, square, tapered, straight, or monopole structural forms.

ii. Guyed masts shall be supported and held in position by guy wires or ropes.

iii. Mast guy ropes shall be made from pre-stretched of the guy wires shall be the maximum likely to occur in the worst loading condition.

iv. Guy wires must not be overtightened in the installation of guy towers in order to avoid excessive tension, which may cause alignment problems, cable rupture, and permanent wrapping of tower structural parts.

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Self-Supporting Towers:

a.   Self-supporting towers are free- standing lattice structures

b.   When land availability is limited, the use of self-supporting towers with tapered sections and faces that vary according to height and load capacity is recommended, provided that it is technically feasible to install them.

c.   Self-supporting towers shall be designed and constructed as lattice structures and have the following features:

   i.   Triangular or square structure.

   ii.   Tube legs, angle legs, lattice legs or solid round legs.

   iii.   Sections in steel angle steel or steel tubes.

   iv.   Steel angle cross bracing.

   v.   Tapered sections.

   vi.   Face widths vary according to height and load capacity.

   vii.   Rest platforms provided every 20 meters of height.

   viii.   Work platforms provided at all height where antennas are to be installed

   ix.   Fitted with climbing ladder.

Roof Mounts:
Roof mounts are an inexpensive way of elevating signals above roof interference or any other obstruction. The design and installation of roof mounts have the following specifications and recommendations:

   i.   Structural checks must be made to ascertain the capability of a chosen roof to withstand the additional load being imposed on it by the structure and the entire antenna array it will support.

   ii.   All roof-mounted masts or towers must be certified by the building or structural engineer before they are installed.

   iii.   As a general rule, roof mounts should be limited to low-weight, light-weight structures of low height that support minimal dead and dynamic loads.

   iv.   Roof mounts can be installed in penetrating or non-penetrating modes and can be self-supporting or guyed. However, non-penetrating roof mounts are most suitable for flat surfaces (Mohammed, 2019).

Concept of Information Provision and Dissemination

The effectiveness of information dissemination rests considerably on how it is shared and accessed. According to the Best Communications Degrees (2022), dissemination of information is the means by which facts are distributed to the public at large. Information dissemination is the distribution of information to the general public by an agency that is

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mandated to release information in any public sector. The information released to the public is regulated by the government in terms of its content and quality (Chiabai, Rübbelke, & Maurer, 2010). The means by which people and various organizations distribute information has exploded within the last several decades. Oral and visual communications were the first means humans used to distribute information, followed by written communication. All forms of communication stem from these basic means. Traditional and social media represent the two general forms by which humans disseminate information in contemporary society. Traditional media include phones, television, oral communication, and print publications. Social media encompasses text messages, microblogs, and online news outlets. Improvements in technology have made these outlets increasingly popular and have become the main ways of distributing information because of the speed at which dissemination occurs. Moreover, Dhawan (2010) perceives information dissemination as a one-way form of communication, circulating information and advice mainly through mass media in a cost-effective and timely manner. In some cases, the media are posters and pamphlets, while in others, reliance is exclusively on text-based print media.

In reality, the organization of knowledge is essential for its storage and efficient access in the future to information seekers. Various factors determine the rate of information dissemination. The manner in which information is made available by the state and political administration for public consumption is also an important factor that influences how it spreads across social echelons (Blake, 2011). Other than this, libraries and databases support the dissemination of new knowledge as much as research, which creates new knowledge that gets disseminated via periodicals and journals. A system that supports the advanced dissemination of information must also support its advanced and efficient retrieval. For retrieval, its storage must be organized based on classification schemes that correctly specify where to place certain knowledge and in what categories or taxa (Hjørland, 2014). However, community building and the growth of knowledge societies are determined by free, fair, and equitable access to information and knowledge, wherein libraries, social media, etc. play a crucial role (Scott, 2011). The more efficient the modes of access to information are, the faster it is for the users to retrieve it. Faster retrieval of desired information and knowledge accelerates the pace of learning and education, growth, and sustainable development (Asselin & Doiron, 2016).

Information Dissemination Systems

The digital information era has brought incredible advances in computing and communication technology—advances that have made possible the advent of new methods of communication, such as the web and email, and their penetration in all spheres of our lives. Increasingly accessible electronic communication is changing the way businesses work and people live. The spread of the Internet has reached almost all parts of the world, and even in space, astronauts can read and send email messages. Information dissemination systems can either be client-server-based or peer-to-peer-based. Client-server-based systems are used by most Internet applications, such as Web, FTP, etc., where a data item is stored on a small number (usually one) of designated servers. These nodes serve as data providers, and a large number of other nodes (clients) act as data consumers. To download the data item, the client locates the appropriate server, sends a request to the server, and receives a response (Li, 2005). On the other hand, in peer-to-peer-based systems, each node acts both as a server and a client and stores and queries data items to and from a network. Nodes can join and leave the

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network at any time, and the operation of the system depends on the participation of each node in the network, not the designated servers.

Principles and Standards Guiding Installation of Network Masts in Nigeria

According to the Nigeria Communication Commission (2009), the following guidelines issued on April 9th, 2009 provide the following:

Standards to be adhered to by telecommunication services providers and operators, designers, fabricators, and installers of telecommunications towers towards ensuring environmental safety and sound engineering practices

a.   Takes cognizance of types and constituents of towers structures and also provides data on winds speeds in Nigeria which may be used as reference materials for engineers in the design of masts and towers.

b.   provides for public safety, the safety of personnel and equipment, and the responsibilities of owners, designers, and fabricators of telecommunication masts and towers relating thereto are set out.

c.   The demands of the local operating environment are also taken into consideration by the guidelines, along with the need to achieve substantial conformity with applicable international best practices.

d.   Non-compliance with the mandatory provisions of these guidelines shall be deemed to be an offence punishable under relevant provisions of the Nigeria Communication Commission Act 2003 (the act); the Nigeria Communications (Enforcement Processes) Regulations 2005; and other applicable laws.

Roles of Network Mast in Information Provision and Dissemination

Network masts form part of the infrastructure required for an effective communication system. To understand the role network masts, play in aiding dissemination of information, it is helpful to imagine the Nigerian landscape is divided up into thousands of interlinked cells. Together, these form the mobile network. A base station is therefore an integral component of mobile communication. According to Earnest Ndukwe, former executive vice chairman of the Nigerian Communications Commission (NCC), "without base stations, there is no communication." information over the network to connect to a personal and private computer network called a "local area network" (LAN), and then connects the LAN to the Internet, that is, if the LAN is not already connected to the internet. It is apparent from the next figure below that the pre-requisite for Internet access are a computer, a modem, a telephone line, and an ISP. There are myriad types of computers, and the higher the capacity and speed of a computer and the modern telephone line, the faster the access; the same is also applicable for the ISP. Modems and network adaptors are the two most common computer communications technologies that transmit data to and receive it from other computers. In networking, a "repeater" is a simple hardware device that moves all packets from one LAN segment to another. Its main purpose is to extend the length of the network transmission medium beyond the maximum cable lengths. A router is a connecting device that sends packets to the correct LAN segment to take them to their destination. A hub is basically a central controlling device in a star network, which has a network topology in the form of a star.

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Conclusion

It was concluded that information dissemination is the distribution of information to the general public by an agency that is mandated to release information in any public sector. Information dissemination systems can either be client-server-based or peer-to-peer-based. However, for effective and efficient deployment, use, and growth of the networks, service providers must deploy, erect, and install in and around the country network masts, towers, and base stations to disseminate and disperse information and data services to end-users of these services.

Recommendations

1. The communication commission should encourage operators to subscribe to co-location, which allows operators to install their base receiver stations in the same telecommunication tower, reducing the number of masts and the cost of locating telecommunication base stations.

2. Telecommunication masts that are poorly erected should be urgently removed and merged with those that are fairly located to address the immediate problems resulting from the poor location.

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