USING CUTTING-EDGE COMPUTING TECHNOLOGIES IN COMMUNICATION THROUGH SATELLITES

AKHILA PEMMARAJU[1]
1Assistant Professor, Department Of Electronics and Communication Engineering,
Godavari Institute Of Engineering And Technology, Rajahmahendravaram, Andhra Pradesh, India.

Abstract: *In this paper, here a novel concept for cloud computing based on satellites that combine virtualized data resources from satellites and the Internet. I start out by talking about how satellites fit into the cloud computing infrastructure. Second, analyze several setups for access to satellite channels while concentrating on certain practical elements of cloud computing. I then report on our encounters regarding big satellite antennas and antenna farms. The final element will be how satellite cloud computing may affect the growth of information from satellite cloud that makes public resources available.*

Keywords: *cloud computing, satellite antennas, satellite cloud computing*

1. INTRODUCTION

The traditional view of cloud technology is web-based computing with shared and dynamically virtualized computing equipment, software, and information resources. It encourages the employment of groups of autonomous distributed computing assets that present to their user as a solitary coherent system due to its core basis in equivalent computing, networking, grid computing, and spread computing. New-fangled type of service application to access diverse information assets in a transparent, a user welcoming way is currently being planned and implement. The study of cloud platforms for powerful distributed computing services via the network has advanced significantly.

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Figure 1.1 (a) a satellite constellation

Figure 1.1 (b): Establishing a satellite constellation for a high-speed data highway

What Doesn't Cloud Computing Involve?

Firstly, network-based computing does not include cloud computing. While utilizing network computation, applications, and other files are saved on a single firm's server and accessed via the company's network. Cloud computing encompasses a lot more. It includes several businesses, numerous servers, and numerous networks. Furthermore, unlike network computing, which is accessible only through the company's network, cloud-based services, and storage be capable of be access from everywhere in the world via an internet connection.

What exactly is Cloud Computing?

The "cloud" itself, which is a sizable collection of linked computers, is crucial to understanding the notion of cloud computing. These machines might be public or private, personal PCs or network servers. Google, for example, oversees a cloud that consists of both larger servers and smaller PCs. The public (Google users) are able to utilize Google's private cloud, which it owns and manages. This computer network is not exclusive to any one company or enterprise. The programs and data offered by the cloud, which are also cross-platform and cross-enterprise compatible, are accessible to a vast user base. There is online accessibility. Any authorized user with access may use any computer and any Internet connection to view these documents and applications. The technologies and infrastructure supporting the cloud are also invisible to the user. It's unclear if cloud services are based on HTTP, HTML, XML, JavaScript, or any other particular technology.

2. IMPORTANT CLOUD COMPUTATION FACTORS

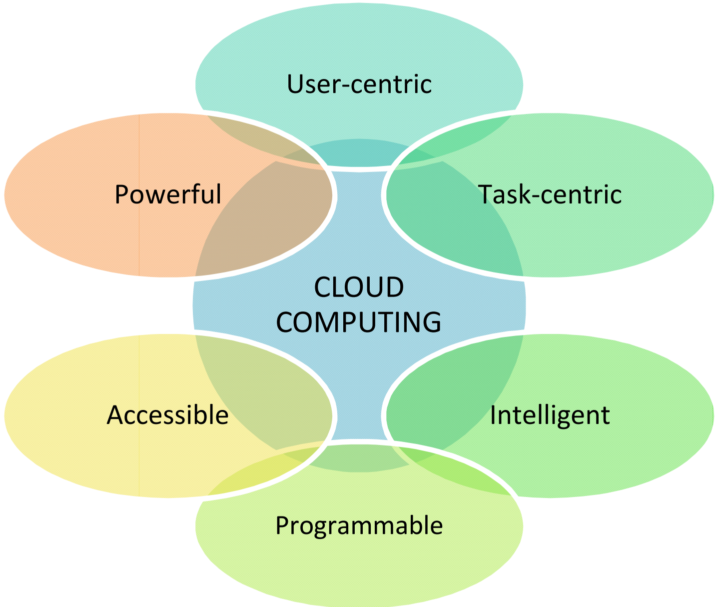

Figure 2.1: important cloud computation factors

Utilizing cloud computation has a virtually limitless numerous of applications. All the programs that a conventional computer would be able to execute with the right middleware might be run on a cloud computing system. Anything, from free word processors to custom computer programs created for a specific organization, might be operated on a cloud computing system. In general, cloud computing offers the following programs and services:

Software as a Service: Cloud application services, often known as "Software as a Service (SaaS)", offering software as a service online, obviating requirement for customers to establish and execute the program on their own computer and streamlining continuance and maintain.

Platform as a Service: Cloud policy services, sometimes referred to as "Platform as a Service (PaaS)" offer a computer platform and/or solution architecture as a service, usually enabling cloud apps and deploying cloud connectivity. The expense and complication of purchasing and administering the fundamental hardware and software layers are eliminated, making it easier to deploy applications in Cloud, CLOUDO, eyeOS, and other platforms are often used by different businesses.

Infrastructure as a Service: in general a platform for virtualized environment as a service. Instead of spending money on servers, software, storage space, or networking equipment, clients build up these facilities as fully outsourcing services. Suppliers will often charge for these sorts of services on an overhead basis, reflecting the size of activities in the resources consumed (and, consequently, the price). IaaS was spawned by virtual private server offerings.

Data as a Service: It was developed on the premise that data may be made available to a user on demand, regardless of the physical location of the data source as well as the distance within an organization. Furthermore, with the advent of service-oriented architecture (SOA), the platform on which the data is stored is no longer significant.

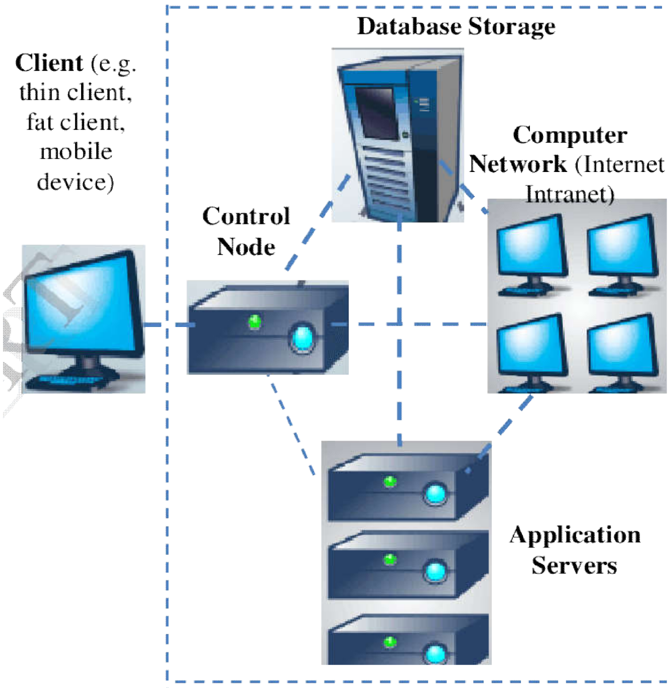

Figure 2.2: Cloud storage

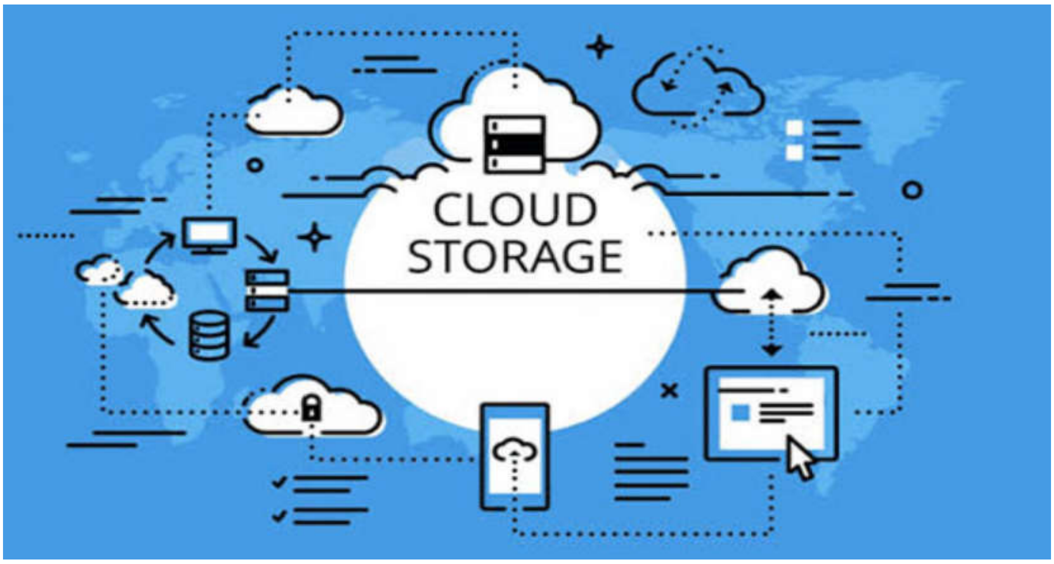

Figure 2.3: Architecture of Cloud-based storage

Storage as a Service: Networked online storage that uses multiple virtual machines to house data rather than a single dedicated server. Big data centers are managed by hosting companies, and those that want hosting for their data can buy or rent space for storage from these and utilize it for their requirements. The data core operators offer the expedient as storage space pools to facilitate the clientele may utilize to store their own collection of records or data objects by virtualizing them in the background in harmony with their requirements. Actually, the storage data could be spread out among several servers.

Decentralized Cloud Storage:

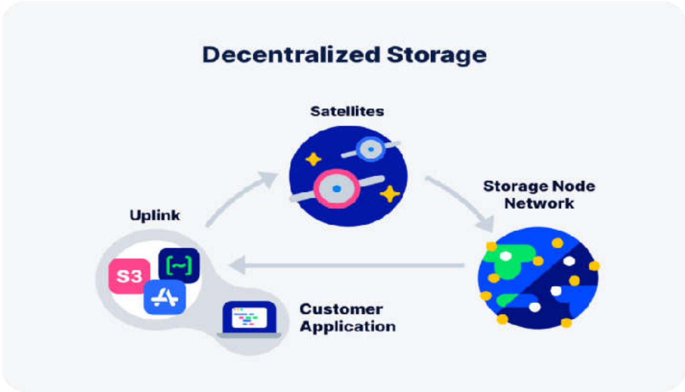

Figure 2.4: Decentralized Cloud Storage

What Is Decentralization of Cloud Storage?

The majority of today's cloud storage is centralized, which means that data is kept in facilities that storage providers control and manage. Notably, Amazon, Microsoft, and Google are the biggest suppliers of cloud storage. Although these storage providers have a number of data center sites spread out geographically in a hub and spoke format, data is still only managed in a select few places by a small number of different organizations. Data is kept in decentralized cloud storage architecture over a huge network of thousands of storage nodes operated by distinct companies that are blind to the content of the hardware they are using. It's a distributed paradigm, and only in the past ten years have advancements in bandwidth availability and performance made it feasible on a worldwide scale. The way privacy and security are handled differs most from the centralized paradigm. You entrust the storage provider with the protection of your data under a centralized storage model, but they have complete access to it. In a decentralized storage approach, you operate on the assumption that no one on the network is trustworthy.

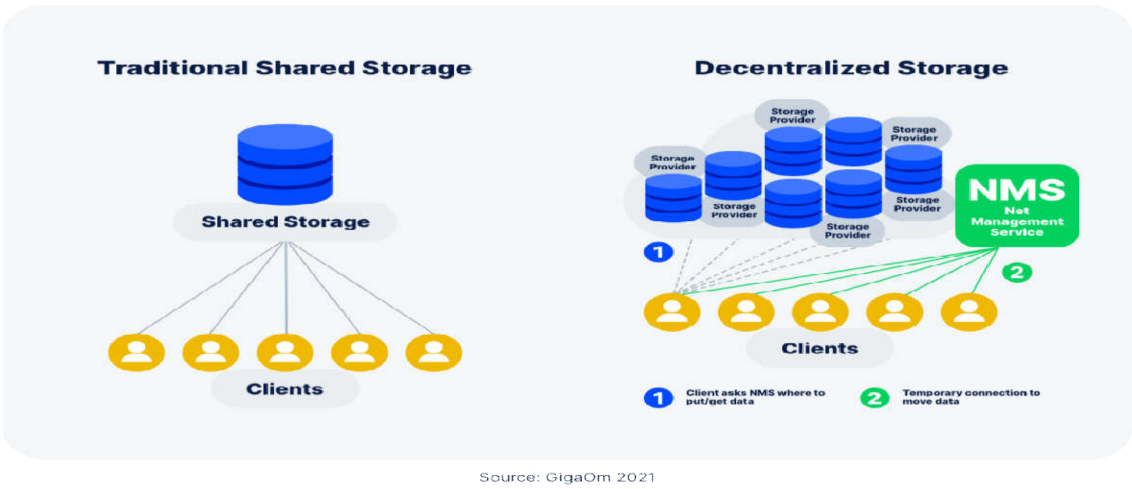

Figure 2.5: Traditional shared Storage Vs Decentralized Storage

The Internet was decentralized in its early development and initial conception. A dispersed network linked the earliest computers together. However, due to bandwidth restrictions, data centers had to be established for the internet to expand, leading to the hub-and-spoke arrangement that is still in use today, where nearly all of our online activities pass via Microsoft, Amazon, or Google. The internet is brought back to its fundamentals via the decentralized cloud.

The Possibility of Decentralized Cloud Storage:

1. Increasing bandwidth availability and speed

Decentralized storage at scale necessitates high-quality bandwidth for storage node operators over a worldwide network. Now that global bandwidth is almost at data center levels, decentralized cloud storage is practical.

2. Technologies utilizing peers

Think back to Napster. It was a peer-to-peer file-sharing innovator. To enhance these protocols and address the problems of file sharing in a widely dispersed context, Freenet, Gnutella, Bit Torrent, and many more programs build upon one another. Peer-to-peer principles were used to create decentralized storage networks, which keep track of data that is fragmented and stored in several locations so that it may be promptly downloaded and retrieved at the edge.

3. Distributed systems knowledge

There were just a few institutions and government agencies building networks when the internet initially began.Now, it appears that everyone is focusing on strategi es to strengthen dispersed networks and progress our networks.The development of m ethods to manage this variability has been facilitated by a standard vocabulary that de scribes tail latency and variability among servers. \

4. Bit coin and block chain technology

Node operators, who might be people or businesses with additional storage space, supply the storage capacity for decentralized storage. The value may be redistributed to those storage node operators in a democratic and scalable method thanks to crypto-currencies and block chain technology.

CLOUD STORAGE WITH DECENTRALIZATION

While publicly accessible decentralized cloud storage networks are constructed without big servers or data centers, Netflix built a decentralized network integrating hardware with existing ISPs to provide the performance their consumers require. Instead, a multi-petabyte storage network is made up of the unused capacity on thousands of hard drives dispersed throughout the globe. Each decentralized vendor has their own unique approach to managing data uploads and downloads, security, maintaining storage nodes, fixing files, and setting prices.

What Do Decentralized Storage Nodes Do?

Hard disks with extra capacity that have been attached to the decentralized network for use as storage nodes are essentially storage nodes. It might be a person with additional desktop space, a small business with extra NAS storage, a small data center with excess server space, or any combination of these. The main determinant of whether a node will be helpful to the network is the amount of readily accessible high-speed bandwidth. That hard drive space is safely stored and distributed via an open-source program, and storage nodes are rewarded with an ERC-20 utility token as payment. According to a recent poll of storage node operators on the Storj network, 87% of them manage only one node, and 72% of them do it from their homes or home offices. With 79% of storage nodes supplying 100MB to more than 1GB in bandwidth, typical performance is fast. 69% of storage nodes employ existing hardware that was either underutilized or repurposed for use as a storage node, which is sustainable.

Decentralized cloud storage is highly efficient and cost-effective for use cases where security, privacy, and on-demand availability are crucial, for large files and data sets, for data that is written once but read many times, receives hundreds of thousands of downloads each month, or requires high transfer speeds. Due to high prices or availability constraints, the most common use cases for decentralized cloud storage today are the most difficult for centralized cloud storage.

The following are the most frequent usage cases:

- Storage and streaming of video
- Native Cloud Applications
- Software and Large File Distribution
- General data backup

Decentralized cloud storage is more readily available, dependable, and resilient than centralized cloud storage on a global scale by design. Even the satellites are multi-region across and across many continents, and every component of the network is multi-region by default with built-in redundancy. This immediately gives the network more scalability and availability.

3. MODELS FOR DEPLOYMENT

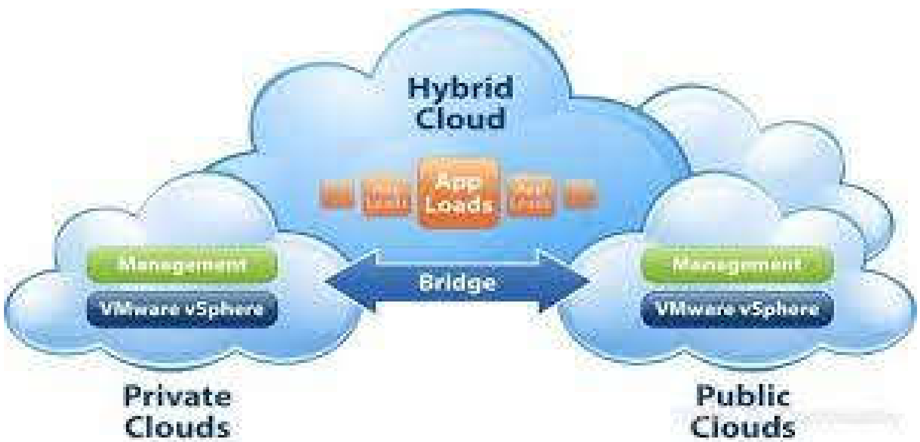

Figure 3.1: Various Cloud Models

The following discussion covers four deployment models:

(a)Public Cloud: A public cloud services can be defined as services that are accessible to customers from a 3rd -party service source over the web. While it may be free of charge or very economical to utilize the term "public" does not always imply that it is. Public cloud suppliers often consist of an entrée controlled method for their customers, thus via a public cloud doesn't automatically make a user's information openly without any difficulty will be reached. An adaptable, cost-effective method of system deployment is made available by public clouds.

(b)Private Cloud: A private cloud provides numerous beneficial for public cloud computing environment, together with elasticity and service based computing. The distinction among a private cloud and a public cloud is that with a private cloud-based service, data, and processes are handling contained by the business devoid of the network bandwidth constraints, protection risks, in addition to regulatory obligations that using public cloud services may involve. Private cloud services also give the customer and the provider more control over the cloud infrastructure, enhancing security and resilience because user access and networks are limited and designated.

(c)Community Cloud: A community cloud is maintained and deployed by a variety of business entities that share similar objectives or security requirements. All community members have access to the applications and cloud-based data.

(d)Hybrid Cloud: A hybrid cloud comprises a number of interconnected public and private clouds. In this paradigm, customers commonly maintain control over data and services that are essential to their businesses while outsourcing less important data and processing to the public cloud.

4. METHODOLOGY

4.1. SATELLITES' PART IN CLOUD COMPUTING

In the image, a cloud architecture having direct access to satellite databases is shown in its basic configuration. This architecture enables access to satellite broadcasting channels that can play digital TV and radio programming as well as interactive channels like those on the Internet. When taking into account live coverage, the volume of data putting over the broadcasting channels of all immediately accessible communication satellites at a specific Earth location is so enormous that it could feasibly contend with the World Wide Web.

According to the infrastructure in place, extending the bandwidth used by independent users to access the Internet across physical channels with limited capacity may be difficult or perhaps impossible. However, as was said in the part above, several of satellites carrying numerous channels are concurrently available from any location on Earth. This quickly builds up to an exchange of data that is significantly more than what the average home Internet connection can handle with a typical satellite television channel throughput of a few Mbit/s.

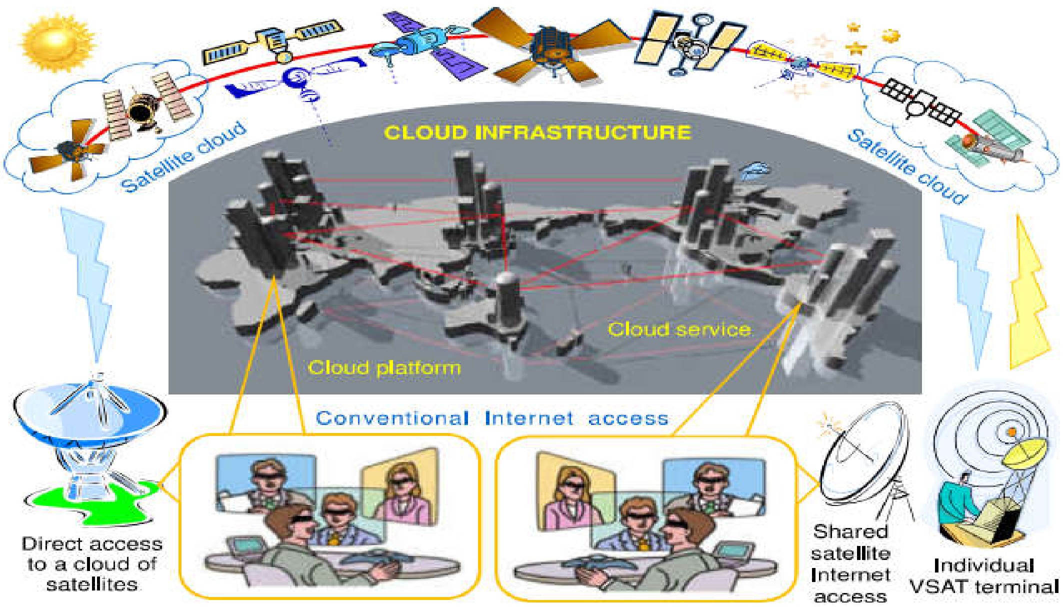

Figure 4.1: An illustration of a cloud computing architecture for satellites.

It is possible to switch between radio and television shows from various satellites using the right satellite receiving equipment by hitting buttons on a regular remote control. The transition between French to German, Italian, Japanese, Portuguese, Russian, Spanish, or other news might be swift or take some time if a motorized satellite antenna is being utilized. Such increased access to knowledge materials opens up possibilities for developing new, more accepting views. The more diverse news coverage will undoubtedly have an influence on how human cognition, attitudes, and judgment grow and are shaped by the media. Through the cross-national integration of information, new additional values that are based on the diversity of viewpoints and supplemental elements and as a result of them have a more comprehensible meaning, develop.

Multicultural information agents for personal or family usage can collaborate via the Internet and create brand-new, possible connections between people who live in different parts of the world when information is obtained from various satellite clouds. The increase of digital broadcasting opportunities as a consequence of the growth and efficiency of both familial and individual access to satellite clouds is only one of the many satellite cloud computing-related difficulties that must also be taken into consideration.

4.2. PHOTOGRAPHY FROM SPACE AND CLOUD STORAGE

Images captured by artificial satellites of Earth or other planets are referred to as satellite imagery. The following four categories of resolution are available when using satellite images for remote sensing:

(a) Spatial resolution is defined as the pixel size of an image representing the size of the surface area (i.e. m2) being measured on the ground, determined by the sensors 'instantaneous field of view (IFOV);
(b) Spectral resolution is defined by the wavelength interval size (discreet segment of the Electromagnetic Spectrum) and number intervals that the sensor is measuring;
(c) Temporal resolution is defined by the amount of time (i.e. days) that passes between imagery collection periods;
(d) Radiometric resolution is defined as the ability of an imaging system to record many levels of brightness (contrast for example).Radiometric resolution refers to the effective bit-depth of the sensor (number of grey scale levels) and is typically expressed as 8-bit (0-255), 11-bit (0-2047), 12-bit (0-4095) or 16bit (065,535).
The need for large-capacity data storage needs is further a result of the highly Brobdingnagian and crucial requirements for high resolution of the acquired satellite pictures. Cloud architectures can help in this situation by providing more storage-space and computational power easily and conveniently; they also provide simple right of entry to information that is centrally located and can be accessed through any well-matched piece of equipment a client chooses to use; Additionally, they make it possible for consumers to effortlessly share their information with other people and serve as an alternative for locally stored information. It is inevitable that the "best" mix of local (PC) processing and storage, on-premise (enterprise data center) processing, storage, and networking, as well as "cloud" computing, will all be available simultaneously. Once more, the extent to which the point of equilibrium could differ would depend on how cost-effectively new developments in computing resources, storage, and data transport compare.

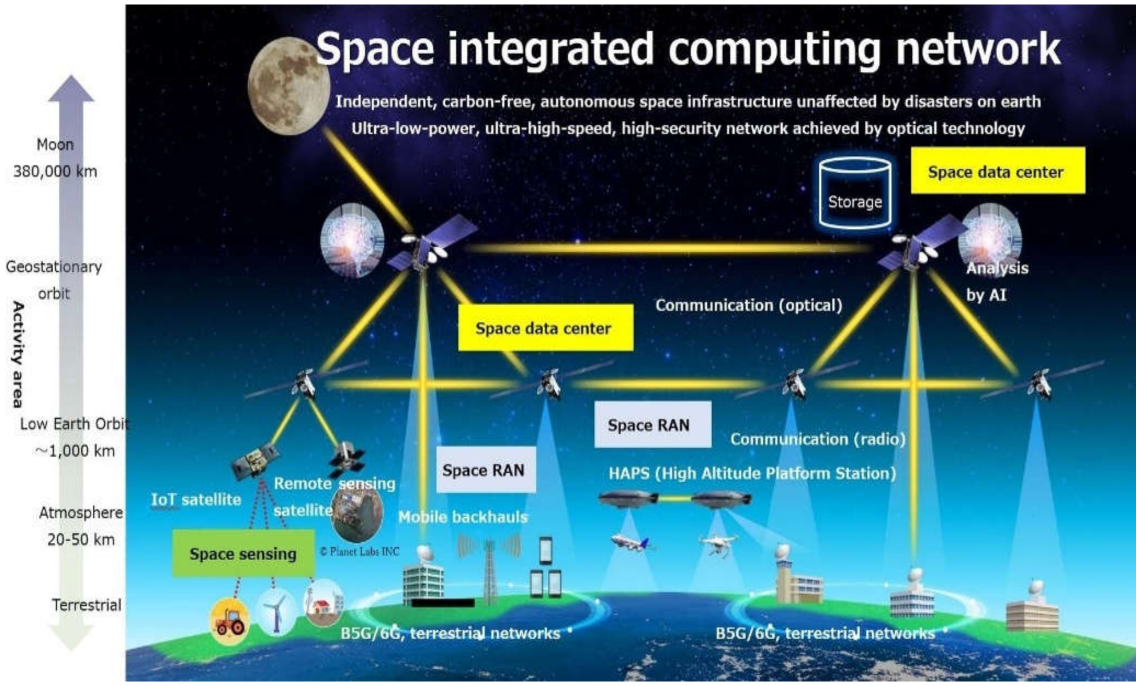

Figure 4.2: Space Integrated Computing Network

The benefits are briefly described below:

(a) Investing solely in storage that is used, with no unused or wasted space.

(b) They save money on IT and hosting by not having to deploy physical storage devices in their data centers or offices.

(c) By delegating storage management activities like backup, data replication, and extra storage device purchases to a service provider, enterprises may concentrate solely on their core competencies.

4.3. CASE STUDY SUMMARY

4.3.1.NASA's NEBULA Cloud Computing for an Infinite Universe of Data

Nebula blends data center containers and cloud computing. It is a brand-new data power house that gives NASA researchers access to processing power whenever they need it. The Nebula application remains in a forty-foot container inside the NASA Ames Research Center in Mountain View, California. The "data center in a box" was constructed within a container, which is now filled with Silicon Mechanics servers and Cisco Systems' Unified Computing System.

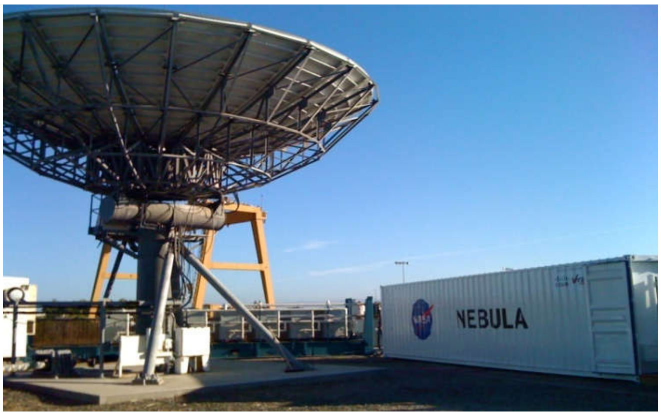

Figure 4.3.1 (a): Nebula Cloud Container

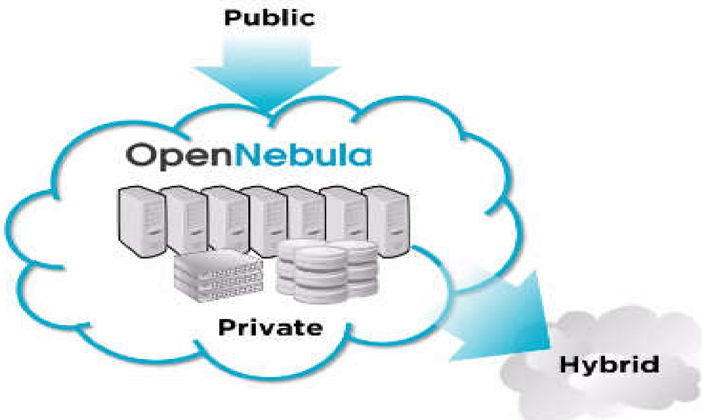

Figure 4.3.1 (b): Cloud Computing Architecture with Open Nebula

Nebula is an open-source self-service platform that offers NASA research high-capacity computation, storage, and network access. It is intended to automatically enhance the computational power and storage available to web apps focused on research and data as demand increases. Nebula offers more exact control over airflow inside the container, enabling quick growth of IT infrastructure and superior energy efficiency. To achieve cost and energy savings, it offers high-capacity computation, storage, and network connection.

The project, which employs a number of open-source components such as Lustre, Eucalyptus, and RabbitMQ, started in 2007.The Nebula Cloud is housed on the Ames InternetExchange, which also gives Nebula the ability to connect through 10 GigE connections.

Three types of storage are offered by Nebula:

(a) Local Storage: The virtual machines utilize local storage to function, but the data is a local disk and is not stored by default. Nebula employs a hardware RAID setup with hot-swappable commodity disks. Up to three drives can fail in this way without causing data loss.

(b)Persistent Block Device: The Nebula provides a persistent network-based block device through the usage of iSCSI. This storage has continuous backups. Conventional programs that have not been adapted to cloud architectures can use this form of storage. This eliminates the storage's dependence on the associated server as a single point of failure and enables extremely dependable and permanent storage.

(c)Object Store: a combination of Object Store, petabytes of information as well as billions of files could be stored with ease. The access-control layer (ACL), management, and maybe the API layer have been added by custom code to open-source object storage systems.

4.3.2. SERVER SKY THINSATS:

A distinctive server farm is a group of computers that are generally kept up by a business to handle server demands that are well above the capacity of a single machine. In server farms, backup servers are frequently present, ready to take over the role of primary servers in the case of a primary server failure. Cluster computing frequently makes use of server farms. Many contemporary supercomputers are built from enormous server farms of fast processors connected through Gigabit Ethernet or more specialized interconnects like Infiniband or Myrinet. The goal of Server Sky is to build large, dispersed systems of incredibly light, solar-powered server satellites and launch them into an orbit 6,000 kilometers above the globe, midway between the inner and outer van Allen belts. Bonded to the back of a 50-gram server sat are a 12-inch solar panel, a 2-GIPS CPU, a terabit solid-state drive, and a microwave transmitter. Thousands of server satellites navigate themselves into dozens of distributed, kilometers-sized three-dimensional clouds utilizing slight pressure for push and liquid crystal shutters for trimtab steering. A server-sat array acts as a massive phased array antenna, directing thousands of communication beams toward receiving stations and towns below its position in orbit. This makes it possible for it to transmit communication and control to the server-sat clouds that pass overhead and follow it in orbit.

Server-sat arrays operate beyond the biosphere, hence there is almost no environmental effect from power production or heat disposal. Server-sat arrays are almost limitless in size due to the vastness and abundance of untapped planetary power in space. latest launch methods and planetary cells manufactured from moon rock might eventually significantly lower the manufacturing and launch costs for the benefit of both the environment and the economy. One trillion server satellites might fit inside a 100 ms ping time of the planet. Quintillions of serversats dispersed around the solar system will eventually be used for cluster processing.

Figure 4.3.2: Server Sky - internet and computation in orbit

4.3.3. NETFLIX: Decentralized Cloud Storage is applying by Netflix. Customers of Netflix were experiencing trouble streaming their video material in locations that were far from the source. Large media files needed to be sent quickly for streaming, but the conventional centralized infrastructure proved unable to do this.

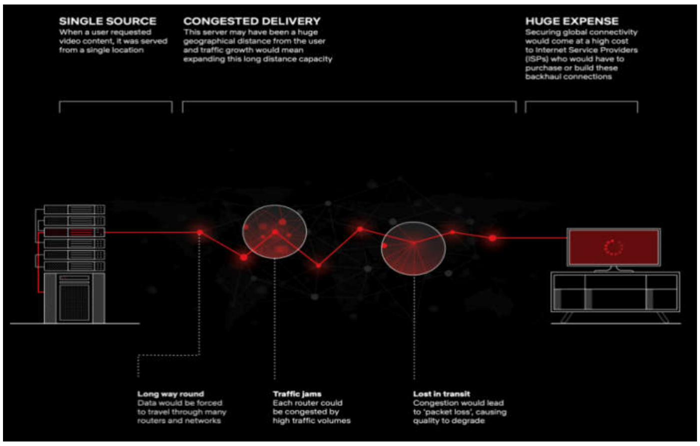

Figure 4.3.3: The challenges of distributing material via a centralized storage strategy are demonstrated by Netflix.

Netflix has to create its own decentralized cloud storage network in order to properly move huge media files through point-to-port around the world. They achieve this by sending massive containers filled with servers to ISPs all over the world, avoiding the need for them to use the centralized hub and spoke distribution model for their video streaming. This has made it feasible for Netflix to offer its service at a bigger scale than would be conceivable with the centralized hyper scalers of today while maintaining excellent quality and availability. Despite the fact that the Netflix decentralized storage network demonstrates many of the advantages of decentralization, it isn't truly a model that other businesses may use. Even without including the server expenses, the agreements reached with the ISPs are amazing but well above what the majority of businesses can accomplish on their own. Fortunately, decentralized cloud storage projects and networks are expanding, so businesses may reap the same advantages as Netflix without the excessive prices and managerial complexities.

4.4. CONCERNS WITH CLOUD SECURITY

- The way organizations construct their networks and systems, make investments in their IT infrastructure, and safeguard sensitive data is changing as a result of cloud computing. Because security is so important and at the forefront of cloud computing, organizations are being forced to reconsider how they safeguard data. One of the most important security challenges is the integrity and availability of information, as well as the safeguarding of private information and the security of communications. Because of the unique characteristics of clouds, new factors, such as problems with multi-tenancy and control over the placement of data, etc., develop. Trust, security, and privacy are always problems in any internet-based business. New security governance models and procedures are therefore needed to address these particular cloud model-related challenges.
- Today's sophisticated scalable and redundant multitier architectures, as well as shared resources environments, greatly reduce the need for data and operations security. The capabilities provided by third-party data centers allow for the isolation of client data, regular backups, and redundancy to reduce failure. Service-level agreements specify obligations in great detail. To safeguard PaaS, IaaS, SaaS, and other types of clients, there exist standards for business continuity and disaster recovery. However, despite agreements and confidence-building efforts, it is widely acknowledged that all of these security claims have certain limitations.
- The cloud computing sector is still in the early phases of the technology adoption cycle since a lot of its products are still considered "vaporware" and have significant technical challenges, especially in the area of data security. However, due to its huge cost reductions, cloud computing will soon be a part of the majority of IT businesses.

- Distributed computing's cloud security field is ill-defined and poorly understood. However, steps are being taken gradually to provide a degree of confidence that takes into account the resources required to support an organization's information processing needs.

5. ASPECTS OF ACTIVE SATELLITE COMPUTING IN THE CLOUD

Many various types of satellites exist in orbit around the Earth and provide a range of services, several which are readily accessible to the general unrestricted. The list of the world's the majority broadly recognized systems of satellites is perhaps the GPS, which is follow by numerous satellite base broadcasting, interactions, and monitoring capabilities. Generally speaking, a satellite's orbit determines its visibility status, which in turn affects whether or not services are available. GPS, for instance, uses automatic switching between many satellites as they appear and go from view to provide continuous navigation. On the other hand, broadcasting and communication satellites are frequently positioned in geostationary orbits to ensure that their motions are in step with the rotary motion of the Earth. This makes it possible to create high-speed communications links and access satellite data streams using fixed-position directional antennas.

Figure 5.1 A satellite antenna farm

This satellite cloud computing architecture presupposes concurrent access to several satellites' resources. In a technical sense, this is possible by setting up several satellite-antennas, each pointed at a unusual satellite in the sky. 10 parabolas are depicted in a representation of a satellite antenna farm. Take note of the varied antenna diameters chosen based on the field signal strengths of the various satellites. But our satellite cloud computing architecture goes beyond a few closely spaced antennas. Through it, several separate satellite-antenna otherwise antenna farms located in various bodily places may be connected and used as one common resource.

The former strategy would obviously involve a substantial investment in machinery and upkeep. However, if the latter method is implemented at those locations without putting further financial strain on the properties' owners, it can turn into a fairly affordable alternative. The satellite-based cloud computing framework, for instance, might retain common access to private satellite receivers that are not currently utilizing by their owner at residences by ongoing web connectivity, in line with the principles of cloud computing.

6. SATELLITE COMPUTATIONS AND SATELLITE DATA CLOUDS

Our first encounter with satellite indication reception occurred in the years 2002–2003. We used a 1 m offset parabola antenna at Aizu-Wakamatsu in Japan's Fukushima region during that time to receive analog satellite TY channels. Since 2003, numerous satellite antenna farm configurations have been tested in studies using new digital technology for satellite DVB channel reception. The big 3 m satellite antenna was ultimately placed in 2009 after a new satellite antenna farm was set up in Hamamatsu, Shizuoka Prefecture, Japan, in 2008.

It is a rather lengthy experience to use numerous antennas at two places more than 500 kilometers apart to access the satellites accessible in Japan and, in turn, hundreds of foreign TV and radio programs. For the purpose to enable users to interact in real-time with programs that are available via satellites and a social platform of individuals in two distinct cities has been built. Although each side often receives TV and radio programming straight from satellites (because basically, the same satellite clouds are available in both regions), the Internet's role has remained crucial. According to our observations and a comparison of the Internet video and satellite video quality, the latter should be preferred.

Satellite cloud computing has the potential to expand people's options and freedom on an individual level and serve as a foundation for new forms of interpersonal interaction. Any person who has a satellite receiver and access to the Internet has the option of renting out their equipment to other users. In order to enable shared access to the majority of satellite TV and radio channels transmitted throughout the world, a group of people from several nations can build up a satellite cloud computing environment. For so, specialist application software should be produced to enable individuals, for instance in Japan, to quickly obtain access to information that is only available from satellites in the USA.

- Since the group members retain control over the information flow in the cloud computing environment, the impartial barrier-free manner of sharing is a crucial component of such collaboration.
- Another benefit is the chance to plan content analyses of information that is disseminated all across the world, gather fresh, unused statistics, identify potential biases, etc.

Satellite cloud computing enhances the traditional virtualization of computer, storage, and networking resources by including the virtualization of satellite-mediated information resources. This new virtualization is based on assembling dynamic constellations of satellites that may be used to access satellite information clouds and their applications. Integrating these virtualized satellite-mediated information resources will significantly increase resource capacity efficiency. As an illustration, many redundant locations (technical redundancy) and various perspectives of the same contents (semantic feature redundancy) both increase the dependability of an information resource's access. It is crucial to remember that the concept of virtualization in relation to cloud computing systems is a hopeful means of combating information flooding issues. Numerous of the existing issues with information flooding could simply go away if "World TV," which depends on satellite information clouds, is deployed. A wide range of services may make use of the continuous flow of global information from clouds of satellites, a phenomenon that unquestionably merits careful research from several angles. For instance, it may make it feasible to conduct research that would be impossible or very difficult to do on current platforms because of their confined geographic reach. It may be used to monitor and predict social trends globally, much as monitoring temperature, humidity, wind, etc. for weather forecasting, when coupled with high-performance cloud computing.

Since satellite information clouds are viewed as publicly available resource s with mostly unrestricted access, several security issues could be brought up.By c reating proper standards for satellite receivers and their connecting protocols, thes e kinds of problems might be solved.

The chance to provide consumers with on-demand apps in a setting with lower risk and higher dependability presented by cloud computing is attractive. It's crucial to realize, though, that current apps cannot simply be released in their current form on the cloud. A successful installation will be aided by careful consideration of design. Cloud-based apps in particular should be set up as virtual appliances so they have all the parts needed to run, update, and administer them. A straightforward design will make it easier to scale the application as demand grows. Additionally, preparing for failure will guarantee that when the inevitable comes, nothing terrible happens.

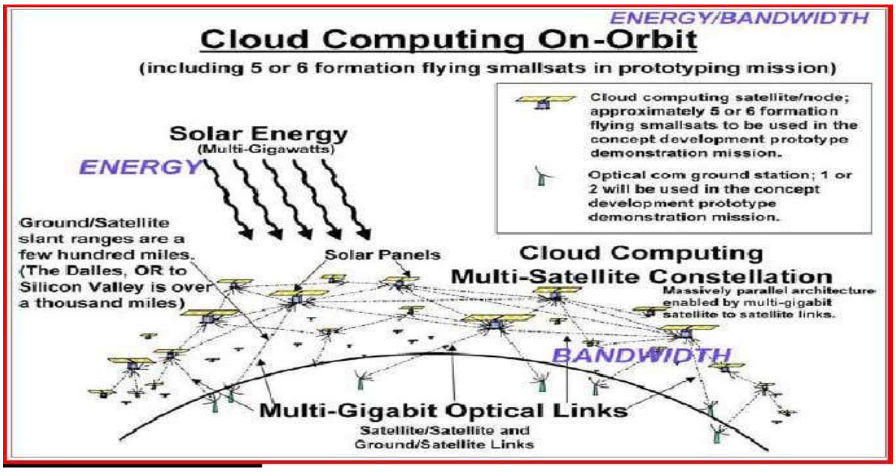

Figure 6.1: Cloud Computing on Multi-Satellite Constellation

Since many technology businesses go to considerable pains to create environmentally friendly data centers, the advantages of cloud computing to the environment are a major motivator. An extreme example is the recent patent granted to Google for a floating data center that would be situated 3 to 7 miles off the coast and contain wave energy machines to generate electricity from the ocean waves to power its computers. Although it's unclear whether Google would ever construct these floating data centers if Google employees can do it underwater, why couldn't the satellite industry? Recently, the notion of "Cloud Computing On Orbit" was proposed, which entails using solar-powered orbiting satellites as space-based server farms.

7. CONCLUSION

A virtualized information resource integration proposal for cloud computing based on satellites and the Internet has been put forth. Satellite clouds, associated TV and radio programs, new prospects, and their possible impact over the growth of data resources encompass all are considered within the context of this notion. There have also been reports on the practical features of satellite cloud computing and our experience with receiving satellite feeds from various locations around. There include some directions for the concepts and the infrastructure's future development.

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