The Future of Cloud Computing Amidst a Desperate Security Maze: The Impact of COVID and the Future Challenges

Venkata Naga Satya Surendra Chimakurthi

ISSN: 2311-8636 (Print)
ISSN: 2312-2021 (Online)

Licensed: CC BY NC

Source of Support: Nil

No Conflict of Interest: Declared

***Email for correspondence:**
chvnssurendra@gmail.com

Solutions Architect, CDBDX-Platforms-DAM (Digital Asset Management), Cognizant Technology Solutions, Dallas, **USA**

ABSTRACT

How far did the covid-19 go in terms of affecting the lives and way of living of people? The outbreak of this deadly virus not only made the people leave their way and stay in isolation but also served a major role in vanishing businesses, making people jobless, causing deaths, and much more. Apart from people losing their lives, there was a massive risk of employees losing jobs, or earning half of what they used to earn. The Covid is influencing the day-to-day routines and methods of experienced individuals. The flare-up of this dangerous virus served a significant job in loss of lives, disappearing organizations, making individuals jobless, isolated, and substantially more. Humans besides losing lives have faced a monstrous situation of losing jobs. With all this when the employees were in a state of work from home, there was an important role played by cloud computing. Its applications played their part in making people achieve their tasks. In this situation, cloud computing has held one side of the rope when employees were in the condition to work remotely. The smart working apps have proved their amazing performances. Its applications had their influence in causing individuals to accomplish their assignments. The truly great individual in the COVID-19 pandemic emergency is the cloud computing environment (CCE). It comprises the high-speed rehearses for administrations that mirror the pattern of quickly deployable applications for keeping up with information. In any case, there is an increment in its utilization, and the exploration shows there is a test to see the performance of CC applications accessibility in regards to the security, data, and everything worried about it. The focal point of this paper is to talk about the difficulties that the Coronavirus has welcomed on cloud computing and what will be the future and further difficulties it.

Keywords: Cloud Computing, Cloud Computing apps, Covid-19, coronavirus pandemic

INTRODUCTION

The most heard word of the last two years around the world is Covid-19 discovered in 2019 in Wuhan, China. It was reported as a virus causing flu and breathing issues leading to several deaths in China and then gradually it spread all over the world. It was the first time where the whole world had shut. This has haunted everyone for two reasons: death and unemployment. Every person was fear of another. People of More than 120 countries came under the influence of this deadly virus. The data showed that more than 25 nations went with the conclusion of schools that impacted 391 million kids (UNESCO, 2020). The

disadvantage of this conclusion brought about letting a large number of youthful ones avoid schooling. As per the FSA (Federal Student Aid) present in the substitutes can be impacted on account of the genuine scene, the lockdown, abroad venturing, or the naughty impacts of taking education while sitting at home (BBC News, 2020). Students of college or universities are as of now not ready to partake in entry-level positions or go to classes nearby. Online schooling is the main suitable choice left to instruct understudies. Essentially, in California, schools are confronting inescapable terminations on account of this virus. They are searching for substitute techniques for keeping direction heading as understudies are obliged to remain at home. To show understudies are remotely utilizing electronic learning is one of the techniques.

LITERATURE REVIEW

Cloud computing is termed as the model to empower worldwide helpful access of network for better computing resources for example storage, servers, services, and applications. With this, it can be quickly supplied and requires a little administration effort or the cooperation of the service provider (Manavalan & Chisty, 2019). Cloud suppliers are always open to threats and opportunities so they also have to understand the outcomes regarding this after the pandemic. They should show themselves prepared and motivated to deal with whatever coming in their way even if it is the demand which is unexpected (Chimakurthi, 2017). On the other side, the opportunity is also available for them to exhibit the flexibility and strength of their administrations tried by the unexpected and sensational expansion in the quantity of individuals telecommuting. Providers of the cloud should watch out for the occasions that are unfolded to guarantee they are proactive with regards to satisfying needs (Stergiou et al., 2018). The cloud computing technology has a vast scale of design underneath providing various services of cloud as well as models of arrangement which will be able to exist along with different software, technologies, and design approaches (Amin & Manavalan, 2017).

COVID-19 AND THE CLOUD

Pondering the Covid emergency, the control of the scattered cloud computing environment has arisen as a truly unprecedented individual. Some universities took good measures for their students and staff to avoid being infected and discovered the learning option from home. Other universities such as Harvard, Stanford, and Jordan followed the same pattern. This is because when a cloud professional opts for it so there is an expansion in it. It is also reported that there are many problems faced at the time of assistance due to the hazardous growth going on in the period of Covid-19 (Al Ashhab, 2019).

In almost all the sectors whether it be a giant organization or a babysitting school, or maybe a hospital, every sector shifted towards electric medium for the management of their daily going activities. This large number of organizations, like Facebook, The University of Jordan, and that is just the beginning, have become very reliant upon the internet for their everyday exercises. Since this illness has spread generally and quickly all through the world, the solicitation for online administrations has been developing likewise with this emergency. The help requests being mentioned are a lot more noteworthy than previously.

With the expanding refinement of advances, more can be accomplished all the more effectively online through these administrations, for example, stock buys, charge installments, schooling, clinical meetings, procurement of airline tickets, sea, our daily road transport, etc. The opposition that is seen in the undertakings has expanded to its peak during the time of covid-19 (Ahmed, 2021). It brought out the ability to acquire clients' fulfillment, given the

absence of in-person choices. To serve the customers in the best way, it is important to make them happy by providing the best internet activation facility. So they do not face any barriers in the tasks they perform. If there will come another time of unexpected changes where everything has to be daled utilizing the computer software, the sectors should be well prepared to take up the challenge. It is ideally an appropriate way where the organization can prepare themselves prior to facing any challenge in the future that is associated with the handling of too much information and the usage of digital platforms (Al-Sai et al., 2019).

THE BEGINNING OF RESEARCHES

Associations ought to likewise distinguish their basic information sources, designs, and engineering, just as to characterize the infrastructure upholding the large information investigation. Also, they would have to quantify the applications and innovations that help the requirements of the association. Profiting from enormous information requires undeniable degrees of readiness as far as applications, devices, and assets are chosen and utilized. Associations likewise need to detail new guidelines and arrangements to guarantee information security, protection, along accuracy. Enormous data/information is supporting associations in settling on choices dependent on investigating high volumes of information from different sources. These elements have expected ventures in bringing a modification to the previous methods by introducing administrations to clients, from the traditional and classic period administrations to the new time administrations (Manavalan, 2020).

We got introduced to the word, online administrations (application administrations), and due to the existence of the image because of endeavors' mindfulness towards innovation administrations. This improvement needs the methods for these administrations to be done from a distance. Starting here, more individuals have begun to check out such administrations since they assist with working from a distance and don't set aside much effort to execute. Furthermore, these immense administrations need a mechanical climate that can oblige them. Those application administrations engineers with inventive thoughts, notwithstanding, need not be stressed over application administrations' restricted assets.

In CCE administrations one basic pattern is cleared, which seems like it will change the world. This is designed like a pond where figuring assets can be designed, and can also serve something different in terms of fast arrangement along with negligible assistance collaboration (Kečo a and Subasi, 2012). The Cloud computing environment can oblige the high requests for administrations in this remarkable emergency, and the reception of CCE administrations decreases the expense and arrangement intricacy. There are a ton of advantages for cloud clients, for example, not putting resources into equipment or programming licenses. CCE has low forthcoming expenses, speedy organization, adaptable elements, and adaptability, while additionally being an answer with space for advancement.

IMPACT OF THE COVID-19 ON CCE

CCE is basically a progression relationship even if it is Covid, except if another innovation comes later. It works as a system arranged from applications, IT foundations, and organization administrations. There is a massive transformation seen where people even of the small sector will sooner or later be switching towards the app facility for their everyday use. Even if it is for buying a farming tool or paying the bill. The CC model incorporates the stage, equipment, programming, and foundation for its help and is currently a total bundle. The categories are divided into three: Infrastructure, software, and platform. They all work as a service. From the time of Covid-19 people have largely started depending on it, and the

number will grow even in the future. Therefore, CCE is extremely responsive to looking after the safety so that no hole is left to entertain any risk.

How did Covid-19 Impact CCE?

How covid impacted our lives need no more introduction because as discussed earlier, the coronavirus has changed our lives upside down. And so is the role played by it affection the technology. Keeping in mind that the world faced a major lockdown and there was no traveling, therefore, all the tasks had to be done while sitting at home. However, if we pay attention to it and recall the time when the world was going through the pandemic, we would recall that how essential the internet and apps became. There was no means of survival without it. But on the other hand, there was also the time when people used to become aggressive while using the internet and that is all because of the overloaded traffic on the websites and apps that made the server slow. But in the end, it is right to be said that the people became more and more connected to it. We can also say that, since the time of coronavirus, CCE has developed a very strong relationship with the technology and the audience. The system of CCE is shaped in such a way where the apps, technology infrastructure, and services work together. It utilizes the assets that are provided by the data center and is then shared through the help of technology. People use this service when there is a rise in demand and services. Today, we see it being used for the purpose of paying bills (Amairah et al., 2019).

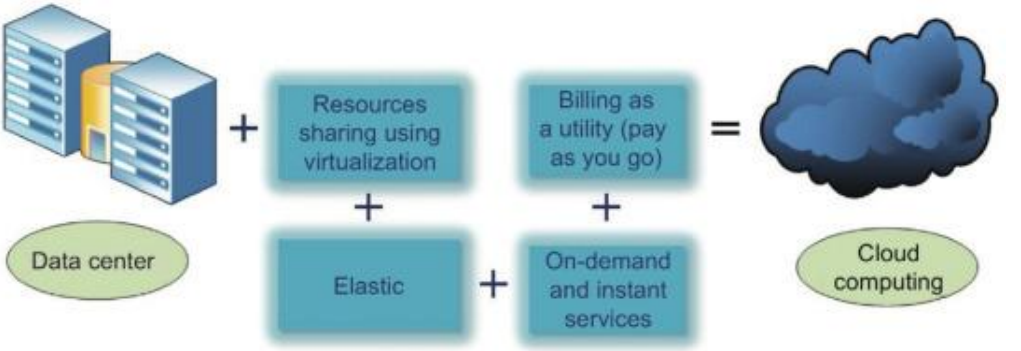

Figure 1: Technology and service (there is a visual explanation as shown in the diagram)

By utilizing computing as a purpose of utility, we see so many prospective that can be found in CCE, and this can be understood by taking the example of electricity, water, and gas. We always have the option of playing the songs while plugging the wire. Same way, the customers are free to pick the software and needs that they have been looking for. However, with the help of this potential, the customers are not supposed to do planning for their IT for the coming years.

Being a utility, we see rapid access coming from it. Same as the other features related to computing, there are always threats involved and that's need to be filled. This way, CCE has to make its game stronger to lessen the risks that make come in the future (Al-Mashhadi et al., 2020). The model of CC is divided into 2 parts. The first one is the CSP that is responsible for delivering the services. The second one is the users and the individuals who are availing of the service. The rest are the middle person (Huang and Nicol 2013).

Because of the usage of applications, there is the requirement for more security. In the model of Cloud Computing, the platforms serve as a complete package for the users (Mell and Grance, 2011). With the help of these services, it is the type of services that are being

offered (Xu, 2012). Here there are more three categories divided which are, 1) the service of infrastructure, the service of software, and the service of the platform (Jansen, 2011). On the other hand when we talk about the development of CC so there comes four models. 1) Private 2) Public 3) Community 4) Hybrid (Na et al., 2010). These are all the models of the cloud.

With each model, we see the arrangement of the cloud and what do it services to the customers. We may see a variation in it depending upon the size, location, type of the service that the customer wants, target audience, and lastly the safety. The arrangement of the CCE is done throughout the technology using virtualization. It is done in such a way where the machiner or there are layers that act between the system of operation, apps, and all (Medina and García, 2014). This virtual machine is the same as a remote controller that is used to command and instruct the devices and enables their working. So to share the resources and their working operations, it is necessary for all the systems to be physically at the same level at the same time (Liu et al., 2020) in order to accept CCE (Amazon, 2020). This whole method has been described with the help of figure 1 given above.

PRIVACY RISKS ASSOCIATED WITH REMOTE WORKING

There are many sorts of plans of action in business sectors. All of these kinds of plans of action were not part of the need of the majority but from the time the online buyer organizations turned out to be vigorously immersed. Today we also see after the time of pandemic that there is a new demand in the purchasing of home in every way. This innovation includes effective gatherings, computerized medical services, online training, network protection, coordination to savvy urban communities, and media communications. Office and schooling focuses have been shut, and remain-at-home requests have brought about a monstrous and supported flood in clients' cooperation, learning, and diversion arrangement. It will bring about sudden harm and security issues. These can be grouped into five new scientific classifications dependent on the issues of safety of home-to-X: Data security, applications, individual gadgets, the Internet, and CCE as shown in the below-given diagram.

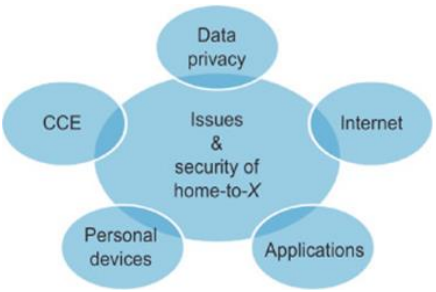

Figure 2**:** Issues that are associated and come in between while one works from home.

To some extent, these are the problems that were communicated by every individual, and we may agree to it as after the global pandemic when the world was locked at homes so they switched on the internet and various applications to be their source of help.

PROTECTION OF INFORMATION

These days the COVID-19 emergency has created colossal measures of information through the various areas' exchanges. One spot that shows a guarantee is a large information. Information is gathered for medical services. Current worries about this huge measure of information are the conditions identified with this emergency. Since it has driven

individuals to telecommute, they are additionally compelled to move, use, and pull out information from the Internet, removable hard circles, or blaze memory cards. This large number of strategies may not be secure to move information since they might change information or copy it, or it very well may be hacked. At home, there is no reinforcement answer for track changes in information or new information. The information quality incorporates four perspectives: Accuracy, repetition, fulfillment, and consistency. Administrative necessities should be followed to stay away from lawful issues however much as could reasonably be expected. Additionally, the subject of the information is being traded across the globe with every nation having various laws and guidelines concerning security laws of information assurance and information uprightness. There will be hazards related to the purview and loss of information. Much more, the business could be hindered if the traffic network is clogged. Questions with regards to where information is put away should be tended to, as do other such lawful prerequisites. At whatever point information insurance is sent and all security arrangements are given, information proprietors ought to have full command over who has the option to get to and has legitimate approval to utilize the information. All institutional security approaches should be clung to.

One of the necessities of getting information transmission is the need to guarantee the presence of a virtual private organization (VPN); notwithstanding, numerous VPNs are viewed as phony and can be malignant. In this manner, businesses and representatives should restrict their utilization of the folio as it were. It will get and encode the correspondences channel with the Internet convention security (IPSec) innovation for the information to be traded securely. The information that is dealt with should be utilizing simple vehicle frameworks so that there is no over-burden on the force of the interchanges channel that is gone through.

INTERNET QUALITY PROBLEMS

The Covid pandemic massively affects the internet, and this startling criticalness and request have created a few issues for Internet specialist organizations. There are a huge number of Britons working or gaining from home during this pandemic, bringing about organizations chopping down the nature of their web-based features. The organizer and head examiner with ZK Research, Zeus Kerravala requested that Cisco execute a loss of 20% parcel to lessen network blockage.

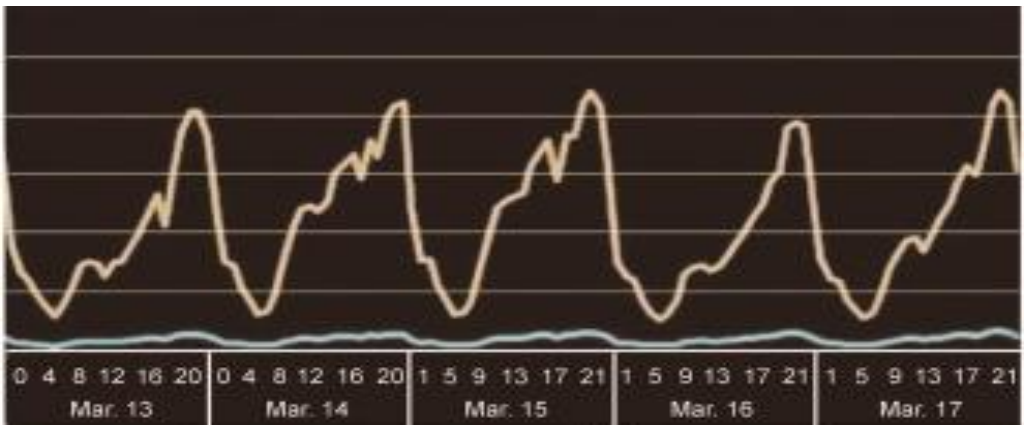

Figure 3: Time that was observed during the consumption of the internet as an open reach and it was found that the graph still has not reached its peak (The data showed that it is 10 x to the daily daytime work timings and can go up to 17 Tb/s)

Considering the importance of it, it is essential to keep a smart eye on the meetings that are taking place. It is seen that in the UK, portable organizations and the providers of the internet are somehow entertained to give the information out, and this is because the traffic that is now online has reached thirty percent. It is also reported that the majority of Britons are working and earning for themselves remotely since the time pandemic occurred. They are bringing about organizations chopping down the nature of their web-based features (Pinkstone, 2020). Netflix, which was at the cutting edge as far as to use, cut down the nature of its spilling during the time of the pandemic because of over-burdens.

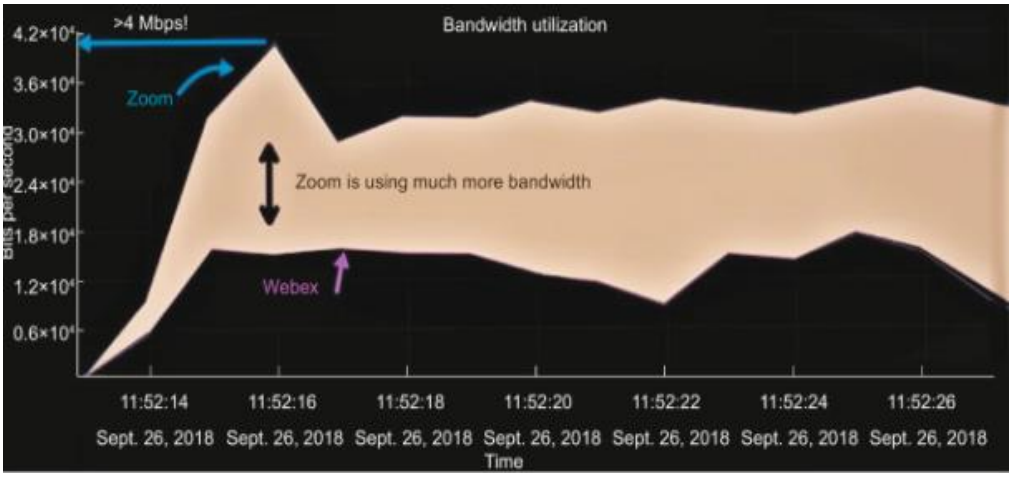

Figure 4: The diagram shows when the parcel misfortune was accomplished at 20%, Webex's calculations kicked in to reestablish the video goal to 720 pixels, while Zoom took somewhat longer to ultimately recuperate to 720 pixels, yet it was outside the testing window

CCE

As the viral episode keeps on spreading, many individuals all over the planet are currently encountering social removing, telecommute conditions, and different changes within every day routines while working from home. While frameworks ought to can handle and deal with the changing speed of catching and examining huge volumes of information, adaptability is a basic attribute of capacity and insightful frameworks, implying that the accessibility of IT foundation is required.

Subsequently, the instruction area needs to buy programming to keep educating from a distance and guarantee it runs without interference. CCE offers different sorts of administrations, for example, site facilitating. It additionally gives online programming and a stage for creating applications.

CCE has a huge foundation as a dispersed assistance situated worldview comprising of multi-space, multi-working, and system of multi-client. It will in general have greater protection from dangers and weaknesses. Since CCE gives virtual systems through virtual machines, clients will be able to catch similarities between the first owners who are destined towards CCE, considering it as a unique one from the rest. This point serves in making cloud computing different and there is no chance of rejection from the owners (Al-Sai et al., 2019).

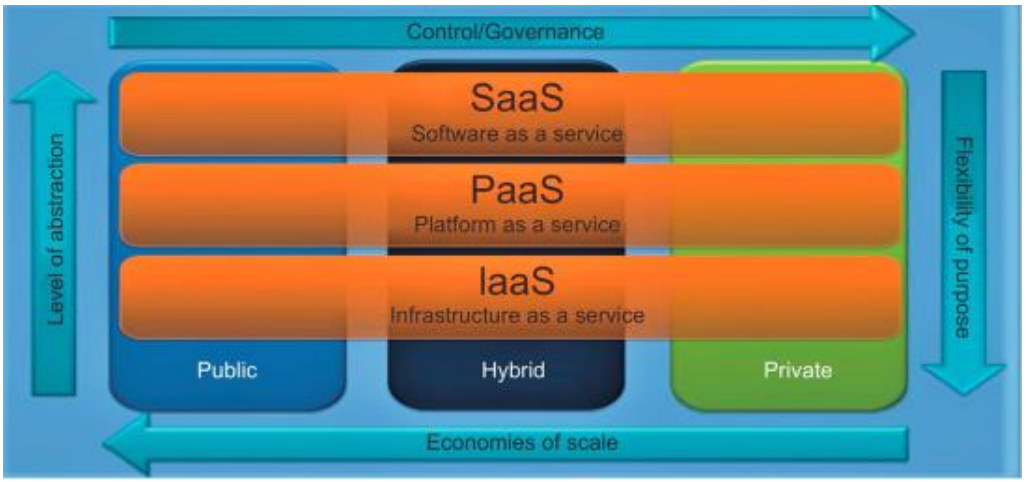

Figure 5: This diagram represents the Cloud Computing model and shows the process of how it is worked. There are three service packages involved in it. Each service indicates the offerings available to the customers. It is to be remembered that the CC varies upon the type, size, location, target audience, and security

LIMITATIONS THAT ARE ASSOCIATED WITH CLOUD COMPUTING

Without a doubt, cloud computing serves a major role and plays an important role in the lives of the one using it, and the one who owns it. It is unlike the typical computer programing, and with this, it has got some limitations as well that may be counted as the positive ones. The distinguished barriers of cloud computing encompass the requirement of high-velocity dependable Internet connectivity to keep away from hyperlink outages, excessive latency, undefined security, etc. The rising tendencies in networking inclusive of big disbursed Internet-connected sensor networks, Internet of Things (IoT), cell facts networks, and additionally actual-time streaming programs have traits that can't be happy via cloud computing. Since cloud computing is largely internet-based computing, it is far a need to have dependable Internet connectivity with sufficient bandwidth to access the offerings. If the hyperlink outage occurs because of any purpose the entire system might be unreachable making a total blackout. Multihoming thru more than one Internet connectivity can reduce the impact of hyperlink outages, however, it's miles very pricey and technically more involved in putting in multi-homing laptop networks. Since cloud structures are positioned on the Internet, that is a huge heterogeneous community with several kinds, topologies, speeds, and technologies without significant management. Because of the non-homogeneous and loosely controlled nature of the Internet, there are numerous troubles particularly satisfactory of service associated ones continue to be unresolved. One such problem that influences the best of carriers severely is community latency. Immediate programs with which customers without delay engage are badly laid low with postpone and delay jitter as a result of latency in networks.

CONCLUSION

The reliance on CC applications and different advancements has significantly expanded because of the current circumstance of the pandemic. Without a doubt, this pandemic emergency has affected practically all areas, like the travel industry, medical care,

instruction, and others. Moreover, the COVID-19 emergency could cause a super durable shift towards telecommuting as prudent steps for containing the infection. The worldwide quick spread of COVID-19 has likewise expanded the volume of information created from different sources. The expansion in the information volume needs extra information stockpiling frameworks, stockpiling systems, new conditions, and novel advances, all of which make a basic test. In this paper, we have attempted to unmistakably show the genuine and expected effects of the Coronavirus emergency on CCE and different innovations because of the unexpected expansion in telecommuting. According to a security point of view, the current circumstance may uncover both CCE and its clients to various kinds of assaults because of the absence of readiness to face such an abrupt circumstance.

REFERENCES

Ahmed, A.A.A. (2021). Event Ticketing Accounting Information System using RFID within the COVID-19 Fitness Etiquettes. Academia Letters, Article 1379. https://doi.org/10.20935/AL1379

Al Ashhab, Z. R., Anbar, M., Singh, M. M., Alieyan, K., Abu Ghazaleh, W. I. (2019). Detection of HTTP flooding DDoS attack using Hadoop with MapReduce: a survey. *Int. J. Adv. Trends Comput. Sci. Eng., 8*(1), 71-77.

Al-Mashhadi, S., Anbar, M., Jalal, R. A., Al-Ani, A. (2020). Design of Cloud Computing Load Balance System Based on SDN Technology. In: Alfred R., Lim Y., Haviluddin H., On C. (eds) Computational Science and Technology. Lecture Notes in Electrical Engineering, vol 603. Springer, Singapore. https://doi.org/10.1007/978-981-15-0058-9_13

Al-Sai, Z. A., Abdullah, R., Husin, M. H. (2019). Big data impacts and challenges: a review. Proc. of IEEE Jordan Intl. Joint Conf. on Electrical Engineering and Information Technology (2019), pp. 150-155. https://doi.org/10.1109/JEEIT.2019.8717484

Amairah, A., Al-tamimi, B. N., Anbar, M., Aloufi, K. (2019). Cloud Computing and Internet of Things Integration Systems: A Review. In: Saeed F., Gazem N., Mohammed F., Busalim A. (eds) Recent Trends in Data Science and Soft Computing. IRICT 2018. Advances in Intelligent Systems and Computing, vol 843. Springer, Cham. https://doi.org/10.1007/978-3-319-99007-1_39

Amazon. (2020). Amazon EC2: Secure and resizable compute capacity for virtually any workload. Available https://aws.amazon.com/ec2

Amin, R., & Manavalan, M. (2017). Modeling Long Short-Term Memory in Quantum Optical Experiments. *International Journal of Reciprocal Symmetry and Physical Sciences*, *4*, 6–13. Retrieved from https://upright.pub/index.php/ijrsps/article/view/48

BBC News. (2020). Coronavirus: School closures and travel curbs in UK plans. *British Broadcasting Corporation*. https://www.bbc.com/news/uk-51714703

Chimakurthi, V. N. S. S. (2017). Cloud Security - A Semantic Approach in End to End Security Compliance. *Engineering International*, *5*(2), 97-106. https://doi.org/10.18034/ei.v5i2.586

Huang, J. W., and Nicol, D. M. (2013). Trust mechanisms for cloud computing. *Journal of Cloud Computing: Advances, Systems and Applications*, *2*(9), 1-14. https://doi.org/10.1186/2192-113X-2-9

Jansen, W. A. (2011). Cloud hooks: security and privacy issues in cloud computing. *IEEE Xplore*, pp. 1-10. https://doi.org/10.1109/HICSS.2011.103

Kečo a, D. and Subasi, A. (2012). Parallelization of genetic algorithms using Hadoop Map/Reduce. *Southeast Europe Journal of Soft Computing*, *2012*(September), 56-59. http://dx.doi.org/10.21533/scjournal.v1i2.61

Liu, F., Tong, J., Mao, J., Bohn, R. (2012). NIST cloud computing reference architecture recommendations of the national institute of standards and technology. https://dl.acm.org/doi/book/10.5555/2385915

Manavalan, M. (2020). Intersection of Artificial Intelligence, Machine Learning, and Internet of Things – An Economic Overview. *Global Disclosure of Economics and Business*, *9*(2), 119-128. https://doi.org/10.18034/gdeb.v9i2.584

Manavalan, M., & Chisty, N. M. A. (2019). Visualizing the Impact of Cyberattacks on Web-Based Transactions on Large-Scale Data and Knowledge-Based Systems. *Engineering International*, *7*(2), 95-104. https://doi.org/10.18034/ei.v7i2.578

Medina, V. and García, J. M. (2014). A survey of migration mechanisms of virtual machines *ACM Computing Surveys, 46*(3) 1-33. https://doi.org/10.1145/2492705

Mell, P. and Grance, T. (2011). The NIST Definition of Cloud Computing. *Computer security*, http://faculty.winthrop.edu/domanm/csci411/Handouts/NIST.pdf

Na, S. H., Park, J. Y., Huh, E. N. (2010). Personal cloud computing security framework. *IEEE Xplore*, pp. 671-675. https://doi.org/10.1109/APSCC.2010.117

Pinkstone, J. (2020). Call for ALL internet providers to 'relax data limits' as online traffic spikes up to 30 per cent in the UK with millions of Britons working from home amid the coronavirus pandemic. *Mail Online.* Available https://www.dailymail.co.uk/sciencetech/article-8130709/Britishbroadband-mobile-internet-providers-surge-data-usage.html

Statistic Brain. (2020). Twitter statistics. Available https://www.statisticbrain.com/twitter-statistics

Stergiou, C., Psannis, K. E., Gupta, B. B., Ishibashi, Y. (2018). Security, privacy & efficiency of sustainable cloud computing for big data & IoT. *Sustainable Computing: Informatics and Systems, 19*(Sept.), 174-184. https://doi.org/10.1016/j.suscom.2018.06.003

UNESCO. (2020). Distance learning solutions- More on UNESCO's COVID-19 Education Response. Available https://en.unesco.org/covid19/educationresponse/solutions

UNESCO. (2020). School closures caused by coronavirus (COVID-19). Available https://en.unesco.org/covid19/educationresponse

Xu, X. (2012). From cloud computing to cloud manufacturing. *Robotics and Computer-Integrated Manufacturing*, *28*(1), 75-86. https://doi.org/10.1016/j.rcim.2011.07.002

--0--

Online Archive

https://i-proclaim.my/journals/index.php/ajhal/issue/archive