

## NETWORKING & ITS TERMS

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### Abstract

In today's society Networking plays a vital role in daily life. This standard of living becomes more and more digital and that we are connected with digital devices and processes. Connectivity is that the rule. Geographic location often defines a electronic network. as an example, a LAN (local area network) connects computers in a very defined physical space, like an building, whereas a WAN (wide area network) can connect computers across continents. the net is that the largest example of a WAN, connecting billion of computers worldwide.

A network comprises two or more computers that are connected-either by cables (wired) or WiFi (wireless)-with the aim of transmitting, exchanging, or sharing data and resources. You build a network using hardware (e.g., routers, switches, access points, and cables) and software (e.g., operating systems or business applications). You Define a network by the protocols it uses to speak, the physical arrangement of its components, how it controls traffic, and its purpose.

In today's Networking have important role in everyone's life. Our everyday life becomes more digital and fast. Not only in our work, but also in our private lives and within the so called public space, we are progressively connected by means of digital devices and processes. We communication for each business, entertainment, and research purpose.the net, online search, email, audio and video sharing, online commerce, live-streaming, and social networks all exist thanks to computer networks.

**Keywords:** [Networking, Topologies, Internet]

### I. INTRODUCTION

A network comprises two or more computers that are connected—either by cables (wired) or WiFi (wireless)—with the aim of transmitting, exchanging, or sharing data and resources. You build a electronic network using hardware (e.g., routers, switches, access points, and cables) and software (e.g., operating systems or business applications).

Geographic location often defines a network. for instance, a LAN (local area network) connects computers in a very defined physical space, like an edifice, whereas a WAN (wide area network) can connect computers across continents. the net is that the largest example of a WAN, connecting billion of computers worldwide.

You can further define a electronic network by the protocols it uses to speak, the physical arrangement of its components, how it controls traffic, and its purpose.

Computer networks enable communication for each business, entertainment, and research purpose. the web, online search, email, audio and video sharing, online commerce, live-streaming, and social networks all exist due to computer networks[1]

### II. LITERATURE REVIEW

A literature review essentially examines relevant literature for a specific field of study. It creates a stable

basis by examining what is already known about a chosen topic [3]. As a result, a literature review opens new approaches for further studies and progresses in the concerning field of research [4]. The review has its main goal in identifying the used methods and concepts for effects and challenges in SDN development.

2.1. Approach Recognized and approved journals and databases for both information system and computer science research were used for the literature research. The used databases and journals are comprised of ACM ([dl.acm.org](http://dl.acm.org)), AISeL ([aisel.aisnet.org](http://aisel.aisnet.org)), IEEE ([ieeexplore.ieee.org](http://ieeexplore.ieee.org)), Science Direct ([www.sciencedirect.com](http://www.sciencedirect.com)) and Springer Link ([link.springer.com](http://link.springer.com)). The time range of the search field was limited to years starting at 2010. Search queries on the time period before the year 2010 did not lead to relevant results, as the term software defined networking and especially its abbreviation SDN was used for other topics. All search queries were attempted between the 1st of June and 15th of June 2014. The defined keywords reflected the main purpose of the literature review. Therefore, the following keywords were defined and used to search for relevant articles and proceedings: (i) sdn challenge, (ii) “software defined networking” challenge, (iii) sdn impact, (iv) “software defined networking” impact, (v) sdn evolution, (vi) “software

defined networking” evolution. The main task of the next step was to find relevant articles for the literature review. The chosen approach was to scan all abstracts from the published articles, which were obtained by searching using the defined keywords. After scanning the abstracts and deciding whether they were relevant or not, the chosen articles were saved for the next step. The initial search results of each database with the defined keywords were as follows (“found” means the number of all articles returned by the queries and “relevant” those papers chosen to investigate in detail): ACM (found: 824, relevant: 11), AISel (found: 50, relevant: 0), IEEE (found: 1290, relevant: 33), Science Direct (found: 241, relevant: 12) ([www.sciencedirect.com](http://www.sciencedirect.com)) and Springer Link (found: 108, relevant: 5). The high number of identified articles versus relevant articles exists for several reasons. The keywords were searched individually (i.e. each database was queried 6 times). Many articles appeared several times during the search query, as various keywords provided overlapping results. These doublets were removed. Second, most of the articles discussed and defined advanced statistical and mathematical technologies not relevant to answering the research question. Furthermore, several articles covered a completely different topic since SDN also can be an abbreviation for other topics like “Supply and Demand Networks” or “Shareware Distribution Network”. In order to evaluate whether the articles were relevant or not, every title and abstract of the found articles was scanned and critically evaluated as to whether the content would be helpful for the research focus. In total, 61 articles were defined as relevant. In the next step every single one of the 61 articles was analyzed in depth and collected in a first concept matrix. Furthermore, the used methods, the main idea, the outcome, and the final classification – if relevant or not – were recorded in that matrix. Furthermore, during transferring of the articles into the concept matrix, an additional 555 Raphael Horvath et al. / Procedia Computer Science 64 (2015) 552 – 561 detailed selection process took place. Thus, a few articles were also classified as not relevant. The reason being that the abstract defined “software defined networking” as the

main part of the article, but largely covered areas not relevant for the review. In the end, 44 articles were included in the literature review. The final concept matrix is provided in the appendix. Finally, based on the final concept matrix, categories and concepts were defined and are described in detail in the following.

## 2.2. Main Results of the Literature Review

The review revealed that the demand and need for research on the topic of SDN combined with challenges and effects increased since the year 2011. With no relevant article found in 2010 and one relevant article found in 2011, the first increase was evident in the year 2012 with seven relevant articles. Already 22 articles deal with challenges and effects of SDN in the year 2013 and in the first half of the year 2014 there were again 14 articles on that topic. The temporal analysis shows that SDN is gaining relevance with further research and analytical approaches being expected within the following years. Figure 1 shows an overview of the identified challenges and effects of SDN. Most papers address the implementation as a challenge. Factors, like vendor-lock-in effects and the high risk of changing traditional network architectures, are included in this category, and discussed and researched most often. The second highest in terms of attention given is the category of demand. Included in this category are security issues arising with software defined networking and the permanent high demand from the end-user combined with the fear of changing traditional networks. The third category describes the topic of know-how existing for software defined networking. Administrating and controlling software defined networks with the existing staff and the overload arising from this were subsumed in this category.

### III. OBJECTIVES

1. Terms & Concepts of Networking.
2. Computer Network & Internet
3. Network Working
4. Network Topologies
5. Network Security
6. Computer networking solutions and IBM
7. Some Of the Networking Websites In India

#### IV. TERMS & CONCEPTS OF NETWORKING IN INDIA

1. IP address: An IP address is a unique number assigned to every device connected to a network that uses the Internet Protocol for communication. Each IP address identifies the device's host network and the location of the device on the host network. When one device sends data to another, the data includes a 'header' that includes the IP address of the sending device and the IP address of the destination device.
2. Nodes: A node is a connection point inside a network that can receive, send, create, or store data. Each node requires you to provide some form of identification to receive access, like an IP address. A few examples of nodes include computers, printers, modems, bridges, and switches. A node is essentially any network device that can recognize, process, and transmit information to any other network node.
3. Routers: A router is a physical or virtual device that sends information contained in data packets between networks. Routers analyze data within the packets to determine the best way for the information to reach its ultimate destination. Routers forward data packets until they reach their destination node.
4. Switches: A switch is a device that connects other devices and manages node-to-node communication within a network; ensuring data packets reach their ultimate destination. While a router sends information between networks, a switch sends information between nodes in a single network.[2] When discussing computer networks, 'switching' refers to how data is transferred between devices in a network. The three main types of switching are as follows:  
  
Circuit switching, which establishes a dedicated communication path between nodes in a network.

This dedicated path assures the full bandwidth is available during the transmission, meaning no other traffic can travel along that path.

Packet switching involves breaking down data into independent components called packets which, because of their small size, make fewer demands on the network. The packets travel through the network to their end destination.

Message switching sends a message in its entirety from the source node, traveling from switch to switch until it reaches its destination node.

5. Ports: A port identifies a specific connection between network devices. Each port is identified by a number. If you think of an IP address as comparable to the address of a hotel, then ports are the suites or room numbers within that hotel. Computers use port numbers to determine which application, service, or process should receive specific messages.
6. Network cable types: The most common network cable types are Ethernet twisted pair, coaxial, and fiber optic. The choice of cable type depends on the size of the network, the arrangement of network elements, and the physical distance between devices.

#### V. COMPUTER NETWORK & INTERNET

The internet is actually a network of networks that connects billions of digital devices worldwide. Standard protocols allow communication between these devices. Those protocols include hypertext transfer protocol (the 'http' in front of all website addresses). Internet protocol (or IP addresses) are the unique identifying numbers required of every device that accesses the internet. IP addresses are comparable to your mailing address, providing unique location information so that information can be delivered correctly.[2]

Internet Service Providers (ISPs) and Network Service Providers (NSPs) provide the infrastructure that allows the transmission of packets of data or information over

the internet. Every bit of information sent over the internet doesn't go to every device connected to the internet. It's the combination of protocols and infrastructure that tells information exactly where to go<sup>3</sup>.

The wired or wireless connection of two or more computers for the purpose of sharing data and resources form a computer network. Today, nearly every digital device belongs to a computer network.

In an office setting, you and your colleagues may share access to a printer or to a group messaging system. The computing network that allows this is likely a LAN or local area network that permits your department to share resources.

A city government might manage a city-wide network of surveillance cameras that monitor traffic flow and incidents. This network would be part of a MAN or metropolitan area network that allows city emergency personnel to respond to traffic accidents, advise drivers of alternate travel routes, and even send traffic tickets to drivers who run red lights.

The Weather Company worked to create a peer-to-peer mesh network that allows mobile devices to communicate directly with other mobile devices without requiring WiFi or cellular connectivity. The Mesh Network Alerts project allows the delivery of life-saving weather information to billions of people, even without an internet connection.<sup>[2]</sup>

## VI. NETWORK WORKING

Computer networks connect nodes like computers, routers, and switches using cables, fiber optics, or wireless signals. These connections allow devices in a network to communicate and share information and resources.

Networks follow protocols, which define how communications are sent and received. These protocols allow devices to communicate<sup>4</sup>. Each device on a network uses an Internet Protocol or IP address, a string of numbers that uniquely identifies a device and allows other devices to recognize it.

Routers are virtual or physical devices that facilitate communications between different networks. Routers

analyze information to determine the best way for data to reach its ultimate destination. Switches connect devices and manage node-to-node communication inside a network, ensuring that bundles of information traveling across the network reach their ultimate destination.

## VII. NETWORK TOPOLOGIES

Network topology refers to how the nodes and links in a network are arranged. A network node is a device that can send, receive, store, or forward data. A network link connects nodes and may be either cabled or wireless links.

Understanding topology types provides the basis for building a successful network. There are a number of topologies but the most common are bus, ring, star, and mesh:

- A bus network topology is when every network node is directly connected to a main cable.
- In a ring topology, nodes are connected in a loop, so each device has exactly two neighbors. Adjacent pairs are connected directly; non-adjacent pairs are connected indirectly through multiple nodes.
- In a star network topology, all nodes are connected to a single, central hub and each node is indirectly connected through that hub.<sup>[3]</sup>
- A mesh topology is defined by overlapping connections between nodes. You can create a full mesh topology, where every node in the network is connected to every other node. You can also create partial mesh topology in which only some nodes are connected to each other and some are connected to the nodes with which they exchange the most data. Full mesh topology can be expensive and time-consuming to execute, which is why it's often reserved for networks that require high redundancy<sup>[3]</sup>. Partial mesh provides less redundancy but is more cost effective and simpler to execute.

## VIII. NETWORK SECURITY

Computer network security protects the integrity of information contained by a network and controls who access that information. Network security policies balance the need to provide service to users with the need to control access to information.

There are many entry points to a network. These entry

points include the hardware and software that comprise the network itself as well as the devices used to access the network, like computers, smartphones, and tablets<sup>5</sup>. Because of these entry points, network security requires using several defense methods. Defenses may include firewalls-devices that monitor network traffic and prevent access to parts of the network based on security rules.

Processes for authenticating users with user IDs and passwords provide another layer of security. Security includes isolating network data so that proprietary or personal information is harder to access than less critical information. Other network security measures include ensuring hardware and software updates and patches are performed regularly, educating network users about their role in security processes, and staying aware of external threats executed by hackers and other malicious actors. Network threats constantly evolve, which makes network security a never-ending process.

The use of public cloud also requires updates to security procedures to ensure continued safety and access. A secure cloud demands a secure underlying network.

#### **IX. COMPUTER NETWORKING SOLUTIONS AND IBM**

Computer networking solutions help businesses enhance traffic, keep users happy, secure the network, and easily provision services. The best computer networking solution is typically a unique configuration based on your specific business type and needs.

Content delivery networks (CDNs), load balancers, and network security-all mentioned above-are examples of technologies that can help businesses craft optimal computer networking solutions. IBM offers additional networking solutions, including:

- Gateway appliances are devices that give you enhanced control over network traffic, let you accelerate your network's performance, and give your network a security boost. Manage your physical and virtual networks for routing multiple VLANs, for firewalls, VPN, traffic shaping and more[4].
- Direct Link secures and accelerates data transfer between private infrastructure, multiclouds, and IBM Cloud.

- Cloud Internet Services are security and performance capabilities designed to protect public-facing web content and applications before they reach the cloud. Get DDoS protection, global load balancing and a suite of security, reliability and performance capabilities designed to protect public-facing web content and applications before they reach the cloud.

Networking services in IBM Cloud provide you with networking solutions to enhance your traffic, keep your users happy, and easily provision resources as you need them.

Build networking skills and get IBM Professional Certification through the courses within the Cloud Site Reliability Engineers (SRE) Professional curriculum.

#### **XII. SOME OF THE NETWORKING WEBSITES IN INDIA**

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|---------------|-------------|-------------|
| 1. WhatsApp   | 2. Facebook | 3. Twitter  |
| 4. Instagram  | 5. LinkedIn | 6. Snapchat |
| 7. Youtube    | 8. Telegram | 9. Quora    |
| 10. Pinterest |             |             |

#### **XIII. FINDINGS OF THE STUDY**

Given the recent accumulation of research on inter-organizational relations and networks and the current fragmentation of the field, it is time to take stock and explore the achievements of, and future challenges for, this field of study<sup>4</sup>. On the basis of a network analysis of the 158 articles on inter-organizational relations and networks that were published in four leading journals from 1980 to 1996, this paper empirically explores the linkages among, and configurations of, core theories and concepts underlying earlier empirical research on inter-organizational relations and networks. We identify core, as well as peripheral, areas of research interest in the field and point out areas of overlap and consolidation. Moreover, our empirical analysis shows that the field segments into four substantive research perspectives, namely social network, power and control, institutional, and institutional economics and strategy clusters. In sum, we suggest an innovative, empirically grounded approach towards a literature review that aims at a synopsis of a field of study and highlights possibly fruitful avenues for future research.

#### XIV. SUGGESTIONS

1. An in-depth understanding of the legal regime and the possible issues that an E-commerce business would face coupled with effective risk management strategies has been the need of the hour for of E-commerce businesses to thrive in this industry.
2. Intellectual Property Rights (IPR) issues in E-commerce transactions have taken a new form with users finding loop holes to not only easily duplicate material but also mislead other users. Hence, much more IPR is needs to effectively regulate tangled web.
3. The development of educational standards has enabled a great demand in the market.
4. The powerful influence of various social media tools like Facebook allows consumers to organize their favorite items and segment it into them and collections to share with others.
5. With the increase in small and medium enterprises, foreign direct investment, multinational companies, creating millions new jobs[4], a new generation of globally minded consumers. With growing job opportunities, customers are willingly able to pay for the products online.
6. The website for online shopping should be in understandable language. The language should be kept simple while making the websites.

#### XV. CONCLUSION

In conclusion, a network is two or more computers connected together using atelecommunication system for the purpose of communicating and sharing resources. Without having anetwork, Companies would not be able to share resources and increase productivity more effectively. The WAN network allowed companies to use the Internet over large areas. This provided the company to have meetings overseas by video conferencing and sharing data over the network. As you can see, Networks have many benefits to the end user. Weather your Network is Wired or Wireless, Networks are an important part of technology

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