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Research Article

Framework of ATM Architecture Deliberation and TCP/IP Performance for 5G Network

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Abstract

In order to increase quality, stability and "tailorability" of data networks the networking community continues to build new technologies and upgrade current systems. But when ISPs try to provide tailored services and expressly offer them over 'best effort' connections to end users, they either cannot solve net neutrality problems or strive for market traffic. This paper focuses only on network protocols, methods, or standards aimed at providing consumers with a customised connection on a public network and referring them to the standards of Differentiated QoS (DQoS). This article contributes to the comprehension of the TCP/IP and ATM standard architectural objectives. First of all, it studies its techno-economic trajectory in order to grasp the success elements. In this manner, it recognizes that although their underlying technological characteristics vary widely and differ, the expectation and objective of all D-QoS standards is to offer a guaranteed connection that consumers may be willing to pay for. As a result, we regard transport layer technologies (for example ATM, Frame Relay), signalling technologies (for instance RSVP), data packet markers (for example IP ToS, WME, QCI), and end-to-end segregation solutions (for instance, leased lines, Network Slicing) as a single cohort. Secondly, by looking at the 5G Network Slicing parallel, we suggest that the commercial performance of Network Slicing can finally seem like that of the previous D-QoS standard despite its intrinsic technological difference with other D-QoS standards. Therefore, we are trying to learn from prior D-QoS trials and recommend the most successful short- and medium-term likelihood of enterprise-based 5G slices inside one service provider domain, and with the most binding level agreements.

Keywords – Network Slicing, Net Neutrality, 5G, ATM, TCP/IP, D-QoS

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1. INTRODUCTION

The internet and telecom networks' exceptional accomplishments are built on the many networking standards developed by the technical community over the previous 50 years. These standards constantly improve the quality and stability of connections, and in certain cases, they enable the quality of 'best effort' connections to be tailored to specific clients or use cases. These standards contain a subset intended to provide guarantees of service quality (QoS) to end customers willing to pay a premium, either expressly or implicitly. The objective of this paper is to explain why D-QoS standards were developed, why certain individuals have suffered commercially, and to secure leases for future D-QoS activities, most notably 5 G Network Slicing. This cohort is referred to as the D-QoS standards. We acknowledge the technological differences between numerous D-QoS standards in this study. Thus, our emphasis is not on 'technical similarity,' but on the D-QoS cohort's 'targets' similarity.

In the networking sector, the D-QoS standards clearly have a role. S. Keshav adds that "Holy Grail's aim is to build a network that is flexible, affordable and that gives the highest quality of telephone network services"[1]. [1]. However, in reality, giving various QoS levels for various services was a controversial subject and sometimes included questions about network neutrality. D-QoS is directly linked to the prospect of ISPs offering various service classes (Cos), which means that individuals who do not pay premium may experience worse than they expected against net neutrality (where they exist). D-QoS often pitches consumers, CPs and regulators on the ISPs.

Since the 1970s, the history of D-QoS norms involves initiatives to provide a premium service by the varied treatment of particular package flows or packages. The former category includes the rental line; ATM virtual circuits and framework relays; and multiple protocol label switching (MPLS) (RSVP). This group often utilizes a connecting mechanism that maintains a persistent connection for the duration of the connection, simulating the reservation of a telephone circuit. The second group is based on the concept of the IP Service Type packet header (ToS). It comprises the Different Services (DiffServ), the 4G Quality of Service Identifier (QCI), and the 5G Quality of Service Indicator (5QI). In general, this group implements a mechanism that does not need a connection or any other circuits.

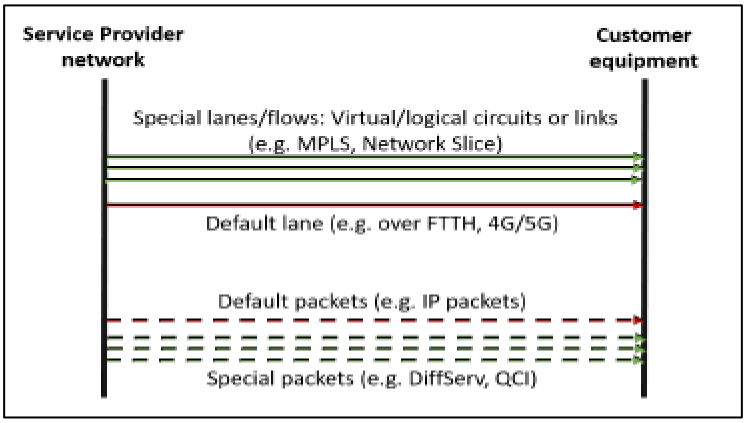

Figure 1: As special lanes (e.g. through flow/path and privacy) or as specific packets, differentiated QoS (D-QoS) may be provided (e.g. packet marking)

As demonstrated in Figure 1, D-QoS standards differ substantially with regard to their technological architecture. In technical publications, this diversity made comparing them very difficult. For instance, the fixed-line ATM and 4G QCI are quite comparable in technological terms. Similarly, 5G Network Slicing's complete insulation notion is hard to compare with most other D-QoS standards. However, all D-QoS standards are rather similar from a commercial point of view in the effort to ensure that clients are ready to pay for a guaranteed connection. In other words, Leased Lines and 5QI are analysed as D-QoS standards despite their extensive technical differences, since both aim to accomplish the same economic objective. This paper is designed to combine these technical distinctions and the business realities into a framework that will give technical and commercial stakeholders with knowledge.

The rising interest in ATM networking is a result of the many advantages that SAT technology provides [17, 19]. This contains (a) a large geographical area connected by ATM islands, (b) multipoint-to-multipoint communications facilitated by an inherent satellite broadcasting capability, and (c) bandwidth on-demand or demand assignment multiple access capacity (DAMA). However, satellite systems are not without limitations. The resources of the satellite communication network, namely the satellite and earth station, are expensive and must be efficiently used. One key problem is the latency in the spread of satellite links from end to end. In order for a Transport Layer protocol such as TCP to function properly over satellite-ATM networks for big bandwidth networks, various performance concerns must be solved as well as interoperability difficulties. The performance of the delay-bandwidth product of the connection is fundamentally associated with a reconciliation and time-based congestion management method (like TCP's). Consequently, the problems with congestion management for large-scale satellite networks vary somewhat from those in low latency land systems.

Two viewpoint networking architectures and system architectures are used to study the issue of performance optimization. In order to maximize the use of ressources, fairly and more efficiently, the network may adopt a range of procedures. These include upgrades for ATM, including feedback control, smart use drop-outs, pro-vc buffer administration to boost fairness and even minimum performance guarantees for higher layers[20]. The transportation layer may adopt different congestion prevention and control strategies at the end of the system to enhance its performance and prevent congestion crashes. Several strategies were suggested and implemented for congestion management of transport layers. Slow starting and avoiding congestion[21], rapid transmission and recuperation, and selective acceptances[18] are the techniques applied in TCP.

Slicing a 5G network is a revolutionary concept that leverages underlying 5G network technologies and virtualization. Their primary objective is to connect logical networks to the same physical infrastructure, and then to customize and isolate the logical networks to meet the demands of each slice (e.g. various use cases, tenant, virtual operator, etc). Thus, Network Slicing is a mechanism for businesses to give diverse experiences to their customers, making it equivalent to traditional D-QoS systems. Network Slicing is considered a D-QoS in this research because its aims are equivalent to those of other D-QoSs, despite the fact that it is not technically similar to them. This is the article's key contribution, and the first component we are aware of is the connection between Network Slicing and preceding attempts to provide D-QoS. We underline that the history of D-QoS demonstrates that the economic viability of 5G Network Slicing is not as definite as is often assumed [3]. The rest of the essay is structured in the same manner. Section II defines the article's scope, ensuring that the analysis is brief. Section III summarizes several ATM models, their respective commercial performance, their key benefits and limitations. The technical, regulatory and economic possibilities and difficulties affecting this D-QoS standard are explored in Section IV. Section V provides a network division of 5G into this category and explores the similarities to the prior D-QoS initiatives. Section VI offers some last comments.

I. SCOPE OF PAPER

The D-QoS standards, which include protocols, methods, and implementations, enable ensured QOS on both fixed and wireless datasets at several layers of the network stack. In actuality, both Category 1 (used for operational or private networking) and Category 2 approaches may contain D-QoS. (Designed to be productised and commercialised as a premium service in a public network). In 4G (LTE) networks, for example, ARP (Allocation and Retention Policy) is a Category 1 mechanism, while QCI is a Category 2 mechanism. Numerous examples of QoS standards being used in wireless networks are illustrated in Fig. 1 [4]: Examples from category 1 may be used to implement a differentiated quality of service (D-QoS). These are either exclusive routes (e.g., by reserving and prioritizing the flow, path, or route) or customized packages (e.g., packet labeling) However, a category 2 standard developed by a number of suppliers (for example, Aruba), companies (for example, iPass), and locations is an example of wireless multimedia extension (WME) (e.g., airports, hotels). This page will discuss just Category 2 standards. We classify numerous D-QoS standards into the relevant levels, using the OSI network model as a guide and starting with Xiao's classification as a [5]. A leased line establishes a physical connection between two physical layer end points. At the datalink layer, examples of QoS provided by X.25, ATM, Frame Relay, Carrier Ethernet, and 5G Network Slicing are presented (Layer 2). The network layer (Layer 3) implements QoS for IP TOS, IntServ/RSVP, DiffServ, Software SD-WAN, QCI, and 5QI networks. QoS is often seen as a layer 2.5 solution for MPLS, especially when it comes to traffic engineering components (MPLS TE).

II. THE MODEL OF ATM NETWORK

The model network satellite-ATM is shown in Figure 2 as a ground, a space, and a network control sector. The foundation section consists of ATM networks that may be connected to other conventional networks. The Network Control Center (NCC) is responsible for managing satellite media and allocating resources. In the space sector, inter-satellite networking through satellite constellation provides seamless worldwide linkages. The network enables ATM cells to be sent through satellite, multiplex, and demultiplex streams of ATM cells, which allow uplinks, downlinks and interfaces, allowing ATM and legacy LANs to be connected. The ATM-satellite network is comprised of a satellite-ATM interface that connects the ATM network to the satellite system. This interface is used for resource allocation, call management, error monitoring, and traffic control, among other things.

Various aspects of the design of different components of the network architecture must be addressed. The next sections discuss some of these difficulties and provide suggestions for choosing the appropriate technology for implementation:

3.1 Service quality model ATM

ATM networks operate in a variety of service categories and meet the quality of service (QoS) requirements associated with each service category. The ATM-Forum Traffic Management Specification 4.0 [16] defines five service categories for ATM networks. Each service category is defined by a traffic contract and a set of QoS parameters [16].

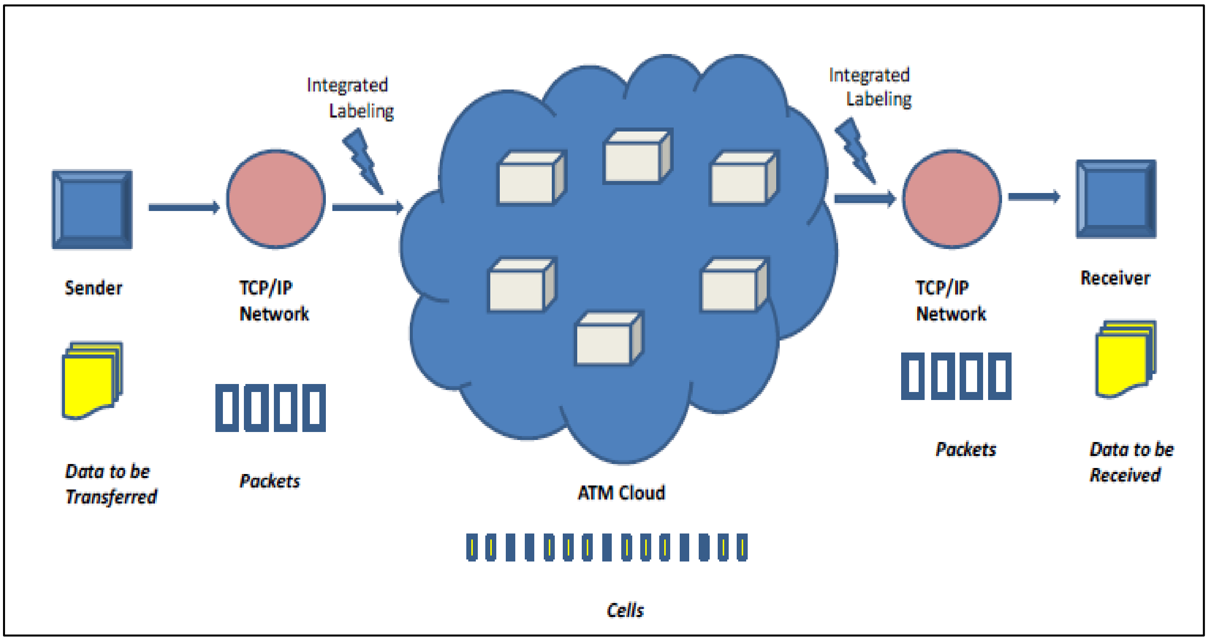

Figure 2: Satellite ATM Network Model

A number of factors specifying the characteristics of source traffic are defined in the transport contract. The specifications for compatible connecting cells are defined. The contract for traffic should include:

Source traffic descriptors. These are used to characterize the source end system's traffic characteristics (SES). Peak Cell Rate (PCR) is a term that refers to the maximum frequency at which a source may always transmit. The Sustained Cell Rate (SCR) determines the source rate on an average basis. The Maximum Burst Size (MBS) parameter specifies the maximum number of PCR back-up cells that the source may send without breaking the SCR. The cell delay variation tolerance (CDVT) and burst tolerance (BT) parameters are used to specify PCR and SCR tolerance. To ensure that arriving cells adhere to traffic contracts, the Generic Cell Rate (GCRA) algorithm described in [1] is employed in PCR / SCR with the necessary tolerance settings. It is discovered that BT = (MBS – 1) (1/SCR = 1/PCR).

The source negotiates QoS settings with the network and sets the expected quality of service provided by the network. The following parameters apply:

Maximum cell transmission delay (Max CTD): This value indicates the maximum time allowed for any linked cell. This delay is a combination of a constant delay in cell processing and a variable time spent waiting for a switch to open.

Peak to Peak Cell Delay Variation (CDV): A quantile is used to represent the variable component of a delay. Peak-to-peak CDV limits the delay variance in a switch cell.

The ratio of discharged ATM cells to total communicated ATM cells determines the ratio of discharged ATM cells to total communicated ATM cells.

3.2 Protocols of Media Access

A fair, flexible and efficient sharing of satellite bandwidth amongst end-users should be done. Special attention should be given to the construction of a media access management algorithm based upon the choice of space and ground technologies. When choosing a protocol for media access, the essential questions to consider are:

Efficiency or performance: This is the time that valuable traffic is transported across the multi-access channel.

Access Delay: It is the period between the message arrival and the beginning of its successful channel transmission.

Stability of the likelihood of unwanted long-term congestion modes.

Rugged channel faults and equipment failures. Robustness.

Complexity of the necessary gear and software.

3.3 Traffic Management Issues

Traffic management is to maximize income from traffic within the limits of traffic contracts, quality of service, and fairness". The traffic management challenge is exacerbated during times of high traffic, and much more so when traffic needs cannot be forecast in advance. As a result, congestion control is a critical component of traffic management.

III. DETERMINING SUCCESS FOR DIFFERENTIATED QoS STANDARDS

The core objective of all D-QoS standards is to treat certain traffic on a public network with extra attention. This unique treatment may be better or lower than the standard treatment for other transport systems. Yet there were relatively few durable successes, such as MPLS, and many more unsuccessful efforts to deliver the DQoS service classes, despite this straightforward purpose. Some of the explanations are in scholarly publications, publications on the sector and even policy comments. (5) the technical, trade and regulatory issues of providing D-QoS have been examined in depth.

According to Benjamin Teitelbaum and Stanislav Shalunov in [6], the high-quality IP service has not been commercially deployed and is unlikely to be. Gary Bachula, Vice President of Internet2, stated the following in his testimony to the United States Senate Committee on Commerce, Science, and Transportation on 7 February 2006 regarding Net Neutrality: "We have spent several years seriously examining various "service quality" strategies, including the formation of a Quality of Service Working Group by our engineers. However, our study and hands-on experience convinced us that just providing more bandwidth was considerably more cost-effective. There is no congestion, and video bits do not need special handling due to the network's enormous capacity." While these opinions are genuine, we believe their criticisms are especially pertinent to the D-QoS, which seeks to offer a premium to a mass market consumer. It is analogous to the [5] "soft assurance" model, in which an ISP provides QoS as a distinct company in addition to its standard connection services. Increased analysis of D-QoS approaches shows commercial success for services such as leasted lines, ATM, Carrier Ethernet, and MPLS within constrained corporate space. With the regulation of voice services on mobile networks, VoLTE is on track to be a financial success in the mass market. These strategies are analogous to [5]'s strict guarantee, in which the ISP provides QoS on an ongoing basis for a fee-based service. Additionally, they demonstrate how QoS may be given in line with the recommendation [5] that QoS be paid to the service as "a feature" rather than as the product itself, while avoiding the explicit selling of QoS.

Given all the efforts to produce D-QoS standards, why has it been difficult to commercialize them as obvious, given their straightforward objective? Due to the many literary issues, we select and compile 12 essential questions to judge if the D-QoS solutions have succeeded or failed relatively.

A. Are the standards technically ready?

This is a reasonably simple criterion that is important to prevent effort fragmentation. It explains why standard organizations are actively engaged in the development of D-QoS services technical standards. The differences between 1999 and 2002 and the various DiffServ standards that lead to RFC2598, RFC3248 and RFC3246 are examples of struggles with standards[6]. In the end, this article has standardized the D-QoS standards under evaluation to adopt.

B. How easy is the operation and implementation?

While standardization is the first step towards marketing, the real execution and day-to-day operations may either bring or demonstrate its business success. Accountabilities (for example, routers), error correction systems, police entry and exit, accounting of various sorts of traffic, etc., are part of operational concerns. For example, X.25 was subsequently removed as one of the earliest D-QoS services because its resource allocations and error correction methods were sluggish and ineffective. The absence of uniform package tagging prompted WME to give suppliers (e.g. Aruba) with WiFi to detect prioritization packages using a deep packet inspection (DPI).

C. Is it consistent with the existing networking ethos?

With the Internet and TCP/IP becoming the de facto global data networking standards, every D-QoS service is appraised by the networking community' s philosophical attitudes. [7] says that the basic objective of the DARPA project is to identify an effective and efficient technique to connect existing networks so that survival may be achieved in the event of a breakdown. [6] predicts that the best effort of traffic will decompose when premium services become prevalent and the end-to-end design ethos for the Internet will be dramatically overhauled. The Net Neutrality Guidelines for BEREC incorporate 'necessity' and 'capacity' criteria, obliging the ISPs to establish that the quality of their service DQoS is both essential and not degraded.

D. Do Service Providers have freedom to choose users?

This is at the heart of the NetNeutrality discussion. As private enterprises, ISPs are seeking the right to change their services as they like. Yet internet access is more and more seen as a 'public good' that should be guaranteed to everyone. We distinguish this flexibility for users with two obvious differences. Table 1 illustrates firstly that the services supplied on a restricted user basis are typically lawful and successful (e.g. ATM or MPLS for business clients) compared to the services that are targeted at the mass market (e.g. DiffServ). Secondly, when regulatory bodies feel the most beneficial to society is the guarantee of preferred service (e.g. voice), there is a strong possibility of economic success in the mass market D-QoS service (e.g., VoLTE on QCI Level 1).

E. Is the service verified by customers?

Customer requirements of the D-QoS are often tough to test and verify. Certain writers used the example of jiggling the locks at the entrance to demonstrate that they were working correctly[6]. Contrasting analogy is comparable with the insurance services that people purchase – without any testing or verification – due to price, tranquility, convenience or legal requirements. For similar reasons, business customers often purchase D-QoS service like ATM and MPLS, which prove that verification of service is not a priceless impediment.

F. Are service providers prepared to provide service insurance?

While many of the D-QoS services geared at business users have explicit service level agreements (SLAs), in general ISPs are unable to supply the mass market consumer with equivalent SLAs. [5] notes that supplying SLA to the general market is exceedingly unlikely since in a network disaster nobody can guarantee anything. Many D-QoS propositions failed to be implemented without a clear assurance of the benefits of utilizing the service.

G. Is the service dependent on others?

It will be difficult to deliver end-to-end premium QoS for an internet that links several independently owned networks if each service is reliant on a separate ISP. In other words, an ISP should not fulfill its QoS obligations to its consumers and then expect a competing ISP to help it in doing so without compensation. [5] includes a sample of a typical 'Peering' agreement to illustrate that no mandated QoS resolution is required. This is distinct from the scheme for voice traffic interconnections with fixed SLAs and termination costs. This results in the importance of inter-domain criteria in the commercial success of numerous D-QoS standards. If end-to-end QoS is provided inside a single ISP domain, success is more likely (e.g., ATM, MPLS). Alternatively, if there is an enforceable Quality of Service SLAs interlinked agreement (e.g., QCI for VoLTE).

H. Is it easy to scale the service?

The Internet's characteristic is that the information is at the edge of the network while the device just performs basic transmission duties in the centre. The incredible rise of the Internet was supported by this. However, the D-QoS standards must be included into the network's core to provide end-to-end QoS guarantees for all devices. Intelligence is a must. This is a major burden since an ISP will have to make major investments before it gains its first premium QoS client to update its network. It is supported in this case that for a narrow market such as MPLS services are viable, but cannot be measured for the mass market (eg IntServ/RSVP)[8]. The D-QoS services are not possible.

I. How easy is the company model?

In order to market DQoS services, the ISPs require straightforward business models and clarity as to who should pay for the premium service. Complexity in the business model implies consumers can hardly explain and adds to the complexity of the Service Providers OSS/BSS systems. Moreover,[6] finds that enterprises that operate under the umbrella of service assurance differentiate the "announced service" from the "engineered service." This allows them to alter the delivery of services without infringing penalties. Similarly, choosing who will pay has often alarmed and provoked Net Neutrality by companies that are expected to ask an ISP to pay it. Content suppliers, however, typically pay for improved user QoS. This is the cornerstone of the Content Distribution Network business model (e.g. AWS, Akamai).

J. Are consumers aware of the proposal?

Many techniques to selling D-QoS services were difficult and it is difficult for clients to grasp them. The evidence that clients favor simplicity when purchasing communications services reflects a proven historical fact. It may be seen from postal services after the 1830s and telephoning after the 1970s[9], fixed broadband service after 2010 and mobile broadband service after 2015. The conclusion is that the pricing of a service is determined by either the service provider's desire to maximize usage and profit or the user's desire for value and simplicity over an extended period of time and across several sectors. The drive for minimalism is unabated. A frequent position expressed by technical and commercial professionals at several telephone operators on the limited consumer adoption of other QCI levels, other than level 1 for VoLTE, is that consumers do not comprehend the complexity of the distinctions and so have no desire for them. VoLTE makes it very evident that voice traffic is prioritized in all countries, both for ISPs and users. [10] proposes a taxonomy for the worldwide harmonization of service priority criteria.

K. Is the service better than its replacements?

Most D-QoS services are gradually enhanced by the best-effort connection to replace them. Customer preference for the mass market has been definitely for the finest possible effort. The tendency is towards the best effort even in business areas where a premium service is compelling. There is increasing evidence, for example, of the rising preference of SD-WANs for MPLS, with the possibility of using a high QoS connection, for leasing corporate customers[11] lines.

IV. 5G NETWORK SLICING LESSONS

At the beginning of the 5G era, Network Slicing is proposed as a technique to handle various business needs and free trade for service providers[2]. Network Slicing is committed to delivering a DQoS in 5G networks by introducing many logical/virtual networks across one 5G net structure[3]. This is an example of a D-QoS-oriented connection, which offers an alternative route to specified traffic. The second 5G QoS technique is 5QI, which builds on 4G QCI to make it possible to associate various kind of traffic with various priority tags. Like QCI, 5QI prioritizes each bearer traffic so that the network may prioritize various kinds of traffic. In this essay we propose that Network Slicing's commercialization will follow the same strategy and be faced with the same obstacles as other D-QoS services. While we recognize that logical isolation is not a key feature of ATM/MPLS, we distinguish between the assurances offered for QoS and the technologies employed. Our thesis is based more on the former than on the latter, indicating a commonality with many other D-QoS services that are not investigated in the literature. We analyze and summarize the analysis using the same parameters in this section.

A. Network Slicing Standards

3GPP Release 15 introduced the first set of Network Slicing standards, and several proofs-of-concepts shown that the standards are practicable in both industry and academia. Slices are defined by 3GPP as a "logical network with specific network and network capabilities" [12]. In general [3], three solution types are mentioned, each of which is covered in 3GPP standards to varying degrees: Group A is defined by autonomous subscription, session management, and mobility for each EU-managed network slice. Similarly, Group B assumes a common RAN in which identity, subscription, and mobility are shared across all slices of the network. Group C assumes a completely shared RAN and a common control aircraft, while the particular divisions include CN user aircraft.

B. Network Slice Implementation

Based on the 3GPP standards, current GSMA initiatives and other industry fora concentrate on Network Slicing implementing guidelines, in particular the Generic Slice Template – which was established by the GSMA in 2018 to minimize the danger that the whole industry would be fragmented. This will assist, but it is impossible to resolve all issues in terms of implementation or remove internationally the danger of fragmented implementation.

C. Network Slicing Philosophy

Network Slicing handles various kinds of service efficiently and raises problems if this is permissible under the principles of net neutrality[14]. However, since it is commonly understood that corporate customers may provide differentiated services over leased lines and MPLS, we suggest that Network Slicing will probably not be opposed on a continuous basis on the basis of net neutrality principles.

D. Network Slicing client selection

The same economic framework that applies to present and historical D-QoS standards (e.g., MPLS, Leased Lines and ATM) in network slicing as a service geared to undertakings should be able to be used by ISPs.

E. Network Slicing Assurance

In order to encourage businesses to adopt a slice, ISPs will be under pressure to issue contractual SLAs. This should be anticipated since companies have to attain strict business results.

F. Network Slicing Customer Check

Corporate clients usually purchase D-QoS standard solutions as an insurance against unfavorable business results without actively checking the service. The same applies to the slice of the network.

G. The ease of marketing Slicing Network

This is still unknown. As Standalone 5G networks become available, they would be tested on the market. However, a large number of ISPs are already experts in selling MPLS/leased lines to companies and must convert their selling competences to Network Slicing.

H. End-to-end network slicing interlinked

In 2018, the interconnection of slices from several ISPs to form a worldwide end-to-end slice is conceivable 1, as shown by Kings' College London. However, perfect interoperability and connectivity would be challenging because slices inside one ISP network area would always be simpler to offer.

I. Network Slicing Customer Understanding

Efforts to inform our consumers about Network Slicing options are done via academic and industrial journaux, seminars and congres (e.g. [15]). As isolated 5G networks are used, this becomes evident.

J. Network Scale Scalability

There is continuing discussion over the number of slices produced by ISP. Ericsson suggested in an issue in July 2018, entitled "How many network slices are needed?," that the more self-supporting slices and the capacity to automate their administration determinate how more ISP slices can be deployed cost efficiently.

K. Network Slice Simplicity

This is unknown at now and becomes more obvious when network trimming is used in standalone 5G networks

L. Network Slice Alternatives

Network Slicing has three competing options. To begin with, boosting 5G connection might persuade some prospective company clients to refuse with certain slices. Secondly, certain clients may want to use slices with SD-WAN. Third, a personalized, private 5G network is a solution for clients that want isolation or practical control of their network infrastructure. In April 2019, a computer weekly story said industry sources projected the "major trend" of these private 5G networks.

M. Summary: Network Slicing Recommendation

It is evident that the success of Network Slicing will rely on much more than technical reasons, from our examination of how all the elements might effect Network Slicing. Network Slicing has, however, been focusing most of the academic and industrial literature on the issues of standardization and implementation[14]. However, there will be just 2 out of the 12-point checklist that depart from the preceding section and will decide the success or failure of the Network Slicing. Given Network Slicing comparative analyzes in this section with the generic observations on other DQoSs (Section IV), it was concluded that potential successes could be high if the business model was explained and that Network Slicing had a strong chance as an enterprise-focused proposal when supplied only within the ISPs domain and with bin.

V. CONCLUSION

D-QoS standards have a history of data network success, particularly when the target market is constrained and service guarantees are offered within an intranet network. Targeted towards the small business market was a pretty strong predictor of success, but it was essentially impossible to achieve economic success with the purpose of reaching the mass market. Even in the business environment, however, the improvement in internet quality leads to IT managers increasingly thinking about the advantages of paying for pricey D-QoS services. This has consequences for 5G Network Slicing as it aims to start out on a market where there is a reduction in the interest for premium-priced D QoS services. While work is still underway to finalize Network Slicing's technical standards and operational specifics, the lessons of the past and current standards indicate a need for a deeper understanding of the business model and of the degree of service insurance given to users, to achieve comparable success.

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