POWER-AWARE RESOURCE ALLOCATION AND VIRTUALIZATION ALGORITHMS FOR 5G EDGE NETWORKING

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Abstract. Scientific knowledge provides a sophisticated way of life to the people of the world. The main contribution of scientific knowledge includes various latest technologies, advanced medicine against all kinds of diseases, which increases the average life of a person. Every technology has pros and cons, depending on the attitude of the person, creating an unbalanced situation for the person. This review article attempts to consider the importance of scientific validation of traditional knowledge.

Keywords: Traditional knowledge, validation, 5G and software, virtualization , clouds and lidar, technologies

Introduction

Networks virtualization has become an integral component of future Internet, offering network operators a way to overcome ossification of the Internet, by consolidating many of their equipments onto standardized high volume components located at centralized datacenters. More precisely by doing In other words , the main advantages of network virtualization are the sharing of physical network resources between multiple virtual network requests (VNR) in a virtual network installation (VNE) environment or multiple service function chain (SFC) requests in a network function. related to effective use through Virtualization resources distribution (RA-NFV) environment, which is a direct application of VNE concepts in 5G virtualized core networks. In this way, it provides more flexibility to manage, expand or shrink the physical network according to the characteristics of VNR or SFC, with efficient resource allocation, which considers the requirements of 5G networks to be much faster and more reliable, with large capacity and low response times. However, allocating sufficient resources to meet all the requirements of a VNR or SFC is virtualized over a physical network with limited residual capacity. in networks difficult is a task . To understand, VNE and RA-NFV processes are usually divided into two subproblems, the first is to map virtual nodes to physical nodes, which is known as the virtual node mapping step. The second is virtual edge mapping, which maps virtual edges to physical paths connecting corresponding nodes in a physical network. Along with such processes, VNE or RA-NFV is usually less physical network resources use through placing expenses minimize and of services acceptable maintaining quality of service (QoS). the rest without VNR and SFCs possible as long as more acceptance to do through income to multiply done increases. It is physical of the network to solve considering the size and dynamic behavior proven NP-Hard problems .

5G is mainstream network technologies

In general In general, 5G will provide users with high mobility and living in densely populated areas with high-quality services similar to fixed network technologies with very minimal latency levels. to provide a promise does Therefore, 5G is a key enabler for the Internet of Things (IoT), providing a platform for connecting a large number of sensors, and it also supports critical services that require very high reliability, global coverage, and very low latency. In addition, the detailed specifications and architecture of 5G are being developed, although recently published ISS specifications to the document according to 5G eng must serve high data rates. Up to 20 Gbps,

serving network node downlink, up to 100 Mbps, downlink user experienced data rate as and very important services for user of the plan 1 ms delay , control of the plan 20 ms delay and provides power saving options. More broadly, 5G should benefit from the integration of network, computing, and storage resources into a single programmable and unified infrastructure through virtualization technologies, enabling the use of all distributed resources, as well as facilitating the convergence of fixed, mobile, and broadcast services.

5G and software networks defined by supply

SDN is reshaping network architecture to support the demands of the future 5G ecosystem , providing a dynamic framework for programmability of 5G networks to facilitate scalable design, construction and management of 5G networks. In particular, the 5G SDN-based architecture separates the network management and routing plans, makes the network management plan fully programmable, and allows the core infrastructure to be seamlessly separated for applications and network services . This makes the future 5G architecture highly manageable and thrifty to be turns In addition, SDN controllers are designed to dynamically route traffic flows using source and destination address information to ensure more efficient data flow when moving across a 5G network , which Improves connection speed and latency on 5G networks. Additionally, because the SDN controller has end-to-end network visibility, it can reduce network bandwidth requirements and overcome potential bottlenecks by intelligently re-routing data flows faster and more efficiently. allows tooth as well as continuous scaling and dynamic provisioning. network expansion or automatic to existing areas respectively capacity to add

5G and network virtualization of functions

Network functions virtualization will be a key enabler of the future 5G infrastructure , where networks will be programmed to rapidly introduce new services based on real-time service needs. This will help 13 to virtualize all the different equipment in 5G networks and bring huge benefits in terms of bandwidth, mobility, flexibility, security, availability and network coverage. In addition, NFV enables network slicing, which allows the creation of multiple virtual networks on top of a shared physical infrastructure, and offers the flexibility to configure these virtual networks to meet the needs of applications, services, devices, customers, or operators. speed, capacity in logical slices according to the requirements of different use cases such as mobile and fixed virtual network operations, Internet of Things networks, automated vehicle infrastructure, content delivery networks, remote health networks, etc. and coverage distribution. An additional advantage of virtualization in 5G network is distributed cloud technology, which allows multiple data centers to appear as a single virtual data center, so that they are scalable, more flexible, seamlessly optimized and controllable, fault tolerant and cost-effective maintenance.

5G and power efficiency

High energy efficiency is an important requirement of 5G systems, as it helps reduce overall network costs and also provides a more stable and resource-efficient way to access 5G systems. Accordingly , and such as 5G networks One of the design principles identified for 5G-Management Plan highlighted. has a special feature that ensures energy-efficient operation of virtual and physical resources used to implement all 5G architecture plans. Functionality can be implemented through capacity-aware algorithms supported by resource health monitoring and analytics. Focusing on the power efficiency of the core network nodes located in the data centers, they used a large amount of aggregated traffic and users to control and manage a large number of access nodes, so saving energy as a load on these core network nodes mechanisms were needed. because of the high level of aggregation, changes must be cost-effective, flexible, flexible and scalable. In this context, virtualized network functionality and cloud technologies are important

tools in the design of 5G systems , which enable better scalability of the infrastructure and less computing overhead, and thus improve power consumption. A management plan in a virtualized network of 5G systems to use network resources as needed provides and unused resources optimal energy remains in saving modes. In this sense, the control plan allows 5G systems to integrate working network services in a small set of available network resources, which work with higher usage, while the rest can be turned off or put into sleep mode. This, in turn, should provide more efficient use of active physical resources, leading to higher power ratings during low load, while increasing speed to manage peak utilization or decrease opportunity will give .

for 5G virtualization studies on

Virtualization and his its customized version, network slicing technology promises to revolutionize fifth-generation systems, enabling software-as-a-service, platforms-as-a-service, and infrastructure-as-a-service . The spread of these services among users is high in volume power consumption who does big cloudy data centers organize to do take came this while high expenses and carbon track cause released . Last to trends stopping transition for , the future in next-generation 5G systems network virtualization to do and cutting according to some the most depends studies sums up. ETSI is normative specifications by included opportunities and boundaries account received without In NFV network services scaling operation automation about common information given They are ETSI 's suitable records NFV framework structure describing they gave , the main attention exemplary degrees how that it is composed focused, then the NFV framework different scaling procedures discussion they did and in NFV functional blocks between mutually effects and data exchange specify and detail scaling order offer to do with were completed scaling operation in execution frame.

Another one request 5G integration with SDN in research according to questionnaire present did Authors 5G cellular based on SDN and NFV contact of the network different integrated architectures present they did , then they are resources distribution for acceptance done methods and to methods attention they looked and virtualization role they emphasized and SDN- based cellular on the network resources distribution for abstraction analysis present they did. From this In addition, the authors of the SDN/NFV architecture a lot tenant supported without present they did it while network department to the provider one how many tenants for network departments one of time in itself to place and one of time in itself them insulation guarantees with to provide possibility will give. They are high level service requirements network functions and infrastructure requirements as well as access control and network departments in the identifier to be need has been special to information until mapping seeing they came out Same so again one authorship in particular, 5G mobile contact networks virtualization to do for business models design for main tool as who increased trade to the theory attention they looked They are heterogeneous and a lot commodity scenarios for auction of the theory main principles and solution approaches describing they gave and 5G cellular contact networks virtualization in doing auctions apply with depends open problems and future research directions designation with completed.

In addition to this, cloudy data of the center price, optimization problem cost and of resources to use optimization from the problem which uses three algorithm model offer they did They are energy consumption and of resources use between linear to relationships attention directed without cloudy count environment for energy consumption model work came out and they are a virtual machine migration the equipment was considered 15 wells .

5G networks design in the process account removable requirements get and classification for software supply and virtualization paradigms role analysis they did and they summarized. The authors are next mobile in systems software supply and virtualization role seeing on the way out

gave an overview of the latest achievements of standardization bodies and they 5G networks network design and functionality done increase for software supply and from virtualization which uses last suggestions by learning they came out . They are delay their objective functions to ensure optimal network utilization and minimize latency in communication with network segments sensitive by doing they created

Summary

Resources distribution the problem solution did of algorithms most of them physical nodes choose today greedy algorithms and physical edges choose for the most short roads , physical nodes and edges choose in the middle enough without coordination apply for used This of coordination lack of common acceptance to do coefficients and whole network productivity reduction can From this besides , it is necessary didn't happen physical resources own into take it is possible more power and count again work opportunities consumption does Also more to delays take will come .

Therefore , this In the article, we will focus on 5G networks for power account received without resources distribution and virtualization algorithms in development consists of bli, it is true nodes and edges complete coordination and never when not to separate done increase for virtualization resources distribution technique work exit through is achieved . Algorithms common is a virtual network installation and network functions virtualization to do frames for resources distribution the problem solution does With that together physical on the network common consumption done power minimizes and new optional features as end to end delay and migration seeing comes out And this own in turn, our the work in our work our possibilities more expansion reason will be.

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