



SOFTWARE DEFINED NETWORK POWERED BY IT

EMPOWERING CUSTOMER FOR SUPERIOR SERVICE EXPERIENCE

Expansion in digital ecosystem has led to unprecedented traffic growth as well as extensive adoption of cloud data centers. Increase in network traffic requires a higher network bandwidth. And, cloud data center has further increased complexity in traffic routing management.

To address this scenario, there is a need for improving network sharing designs and techniques. Software Defined Networks (SDN), a recent innovation in this field, can help the CSPs address this problem when it is integrated with IT ecosystems. This whitepaper will focus on how SDN and IT can help CSPs provide superior service experience.



Digital Explosion – CSPs communication networks are challenged

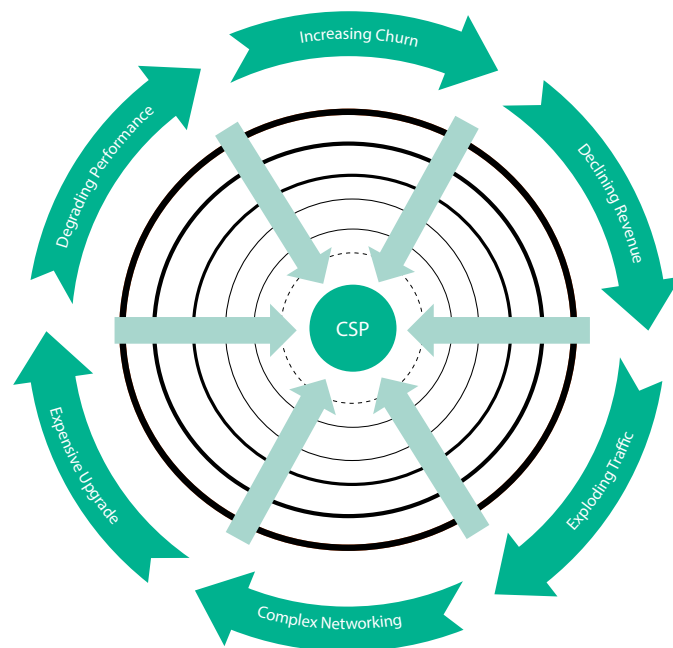
Multiple research institutes have provided a forecast that by 2020, CSP networks will be carrying 120 exabytes of traffic from 25 billion hyper-connected devices. Such an explosive traffic growth will have adverse impact on CSPs network performance if it is not immediately upgraded or redesigned. It is more critical because the recent CSP's customer satisfaction surveys have established a strong relationship between network performance and customer satisfaction. Over 50% of total customer churn is attributed to poor network performance.

If this is such an important parameter for CSPs, then what is stopping them to upgrade their network? The key constraints are -

- Budget constraint: due to signification CSP's revenue shift towards over-the-top players and, also ever escalating network equipment cost.
- CSP's traditional network is not designed to scale-up to a level where it can manage such traffic growth projections and also interrelated traffic routing complexities.

There is a clear need for CSPs to adopt radical change in their networking design. Software Defined Networking (SDN), a

recent revolution in the telecommunications network design, promises to help CSPs in addressing above constraints.



Diagram#1: Digital Explosion – A threat to CSP's business



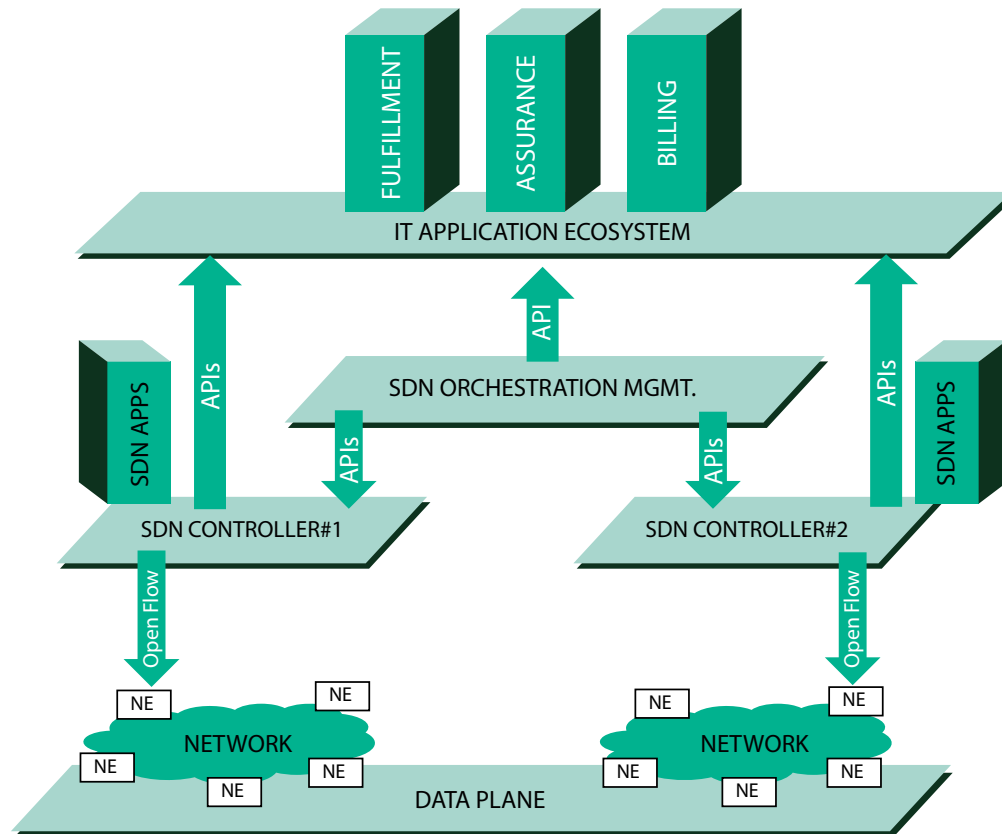
With the expectation of digital explosion in the near future, SDN offers a ray of hope to CSPs by enabling them to improve Customer Service Experience.

Before we delve further on this point, it is important to understand the basic concept of SDN.

The SDN divides the traditional network into two parts –

1. Network Control Layer where routing rules are defined, and
2. Network Infrastructure Layer where data is transported

The Control Layer is placed between IT Applications and Network Infrastructure Layers, and it communicates with both layers using standard set of Application Programming Interfaces (APIs). These APIs are capable of run-time configuration of routing rules in control layer through software programs or IT Applications.



Diagram#2: The SDN Paradigm

The SDN helps CSPs in addressing their network upgrade related challenges by -

1. Reducing CAPEX requirement

It simplifies network equipment design by shifting traditional network element complexity into its control layer; and thereby reduces network cost.

2. Keeping OPEX almost linear

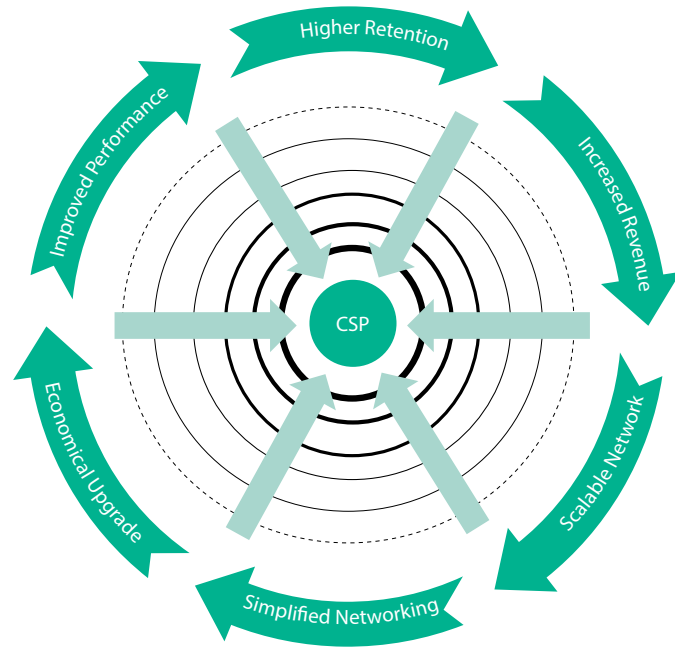
It automats network operation and maintenance activities through its centralised control layer, while network device count increases with traffic growth.

3. Adding Revenue

It provides platform to monetise Network Quality and APIs for its customers and partners.

4. Designing highly scalable Network

It allows to design network resources optimisation algorithms on its programmable control layer.



Diagram#3: An Opportunity for CSP's business

By enabling the design of communication network for tomorrow's digital world, eventually SDN will build a foundation for customer centric communication service offerings.

More importantly it will be able to add more values for enriching customer's service experience when it will be integrated with CSP's IT ecosystems and applications.



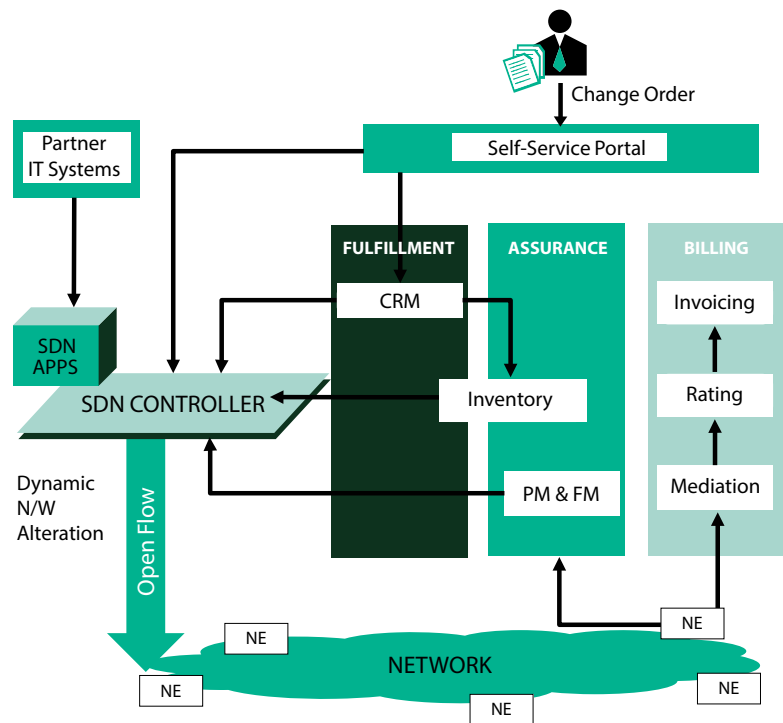
SDN – Powered by IT

The whole SDN concept evolved around SDN controller being programmable. Let's understand how CSP's IT Systems can add more value to its software defined networking.

The CSP's Inventory System can provide end-to-end network topology and service view to SDN controller, which can be used by SDN Applications to dynamically determine or define network routes with desired network service quality e.g. latency and bandwidth etc.

The CSP **Portal System** can submit customer request to SDN controller for instantaneously upgrading or downgrading network bandwidth allocated to its customer. Furthermore, if CSP wishes to expose their SDN APIs to their partners, then eventually CSP will be making their network available as-a-service for them.

The CSP's **Analytics, Network Performance and Fault Monitoring Systems** can trigger predictive and proactive alerts for SDN Controller and Applications to act on real-time network routing alternations to assure consistent and superior customer service experience.



Diagram#4: An Opportunity for CSP's business

It is quite evident that by harnessing power of information available in IT ecosystems, CSP's software define networks can provide more customer empowerment and superior service experience.



SDN – Empowering Customers

Empowering customer means giving full control in customer's hand and SDN will be a perfect tool for this initiative. To understand better, let's consider a scenario where a customer wants to watch five minutes high quality video song on his Smart-TV over its CSP home network. But, immediately he starts experiencing multiple long duration interruptions while video is being buffered.

He realises that his CSP has not provisioned his home network to play such a bandwidth intensive video streaming; and neither

its network is designed for instantaneous bandwidth upgrade. The CSP's customers are expected to use its traditional network service as it is provisioned for them; any change takes time.

In an alternate scenario where the CSP relies on SDN, the bandwidth required to play the song can be determined in real-time and the user interface will prompt the customer to confirm bandwidth upgrade request, obviously with additional charge. SDN, powered by IT systems such as Customer Portal, will empower CSP's customers to

dynamically choose desired bandwidth and enjoy un-interrupted song. The Customer Portal can receive customer's bandwidth upgrade request and will make real-time changes in network quality parameters.

In scenarios such as this, the end customer will be able to fulfil his wish thereby increasing his satisfaction level. Simultaneously, CSP will have an opportunity to make more revenue from the customer making it a win-win situation for both parties.



SDN – Assuring Superior Service Experience

The CSPs' SDN will not only empower its direct customers but will also enable its partners, over-the-top (OTT) players such as video content (song) providers, to assure superior experience to its content consumers irrespective of how much bandwidth is provisioned by its partner's CSPs at its consumer's premise.

In previous example; the high quality video song provider can assure uninterrupted video streaming to its consumer on Smart-TV if it is connected over its partner CSP's software defined network. It will obviously be charged with premium by OTT players and will share the revenue with CSP.

Here, again it can be made feasible by integrating CSP's SDN with OTT player's IT

systems. While customer accesses the song, OTT player system can send instructions to CSP's SDN controller to select a network route which provide desired bandwidth to play the song. Such business-to-business (B2B) SDN interfaces will assure the end customers consistent superior service experience.



Conclusion

While SDN is still going through classic market adoption cycle, in today's environment it is already being looked as a disruptive technology playing an important role for communication industry's survival and success.

The SDN is significant milestone in network evolution as it is making the line between the IT and Network blurred. It allows to bring software intelligence, agility and efficiency into dumb, inflexible and inefficient telecom networks.

The real potential of SDN can be harnessed only with on successful integration with IT systems. The seamless IT-Network integration will not only empower CSPs' Customers and Partners to decide how they want to use their network for better service experience, but also helps for CSP's in reducing cost and increasing revenues.

While the SDN and IT integration promises to unleash innovation in network service creation for customer empowerment and

better service experience, but CSPs will have to face many challenges in coming days as many SDN Apps Vendors and Standards will emerge. The key challenges in developing and managing the SDN-IT integrations are – SDN APIs for IT Applications are either in concept or evolving state, and dealing with diverse and rapidly changing APIs.

About the Author

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