



## **OPERATIONALISING THE NETWORKS OF FUTURE**

A TRANSFORMATIVE PERSPECTIVE ON  
THE COMBINED APPLICATION OF AI/ML  
AND BLOCKCHAIN IN TELECOM



Globally, the telecom industry has gone through tremendous transformation rigours across domains to stay competitive against OTTs and other small-time service providers that come up with some innovative service offerings or the other to entice customers in both consumer and enterprise space. This is what forcing the CSPs globally to consolidate operations and diversify networks with a hope that transformation would help them come out of the “so-called happy zone” of being a pipe provider.

In a dynamic market, like India, with 1.3 billion population, we have seen the emergence of RJio as a greenfield service provider which has become a big challenger to the pioneers of Indian telecom, thanks to their innovative approach in managing the networks and getting ready for the digital boom powering with 5G deployments.

In this transformative journey, the one who leads the technological advancements will survive; others will perish, like how it happened in the past. Today, CSPs need to become DSPs (Digital Service providers) for SMBs, large enterprises and consumers as CSPs already have the connectivity and all they need to do is use same network to full potential and unleash new revenue streams.

SMB is the major untapped segment as plethora of start-ups cropped up across the globe of late. These SMBs want connectivity along with a complete suite of value-added services. Today most of them go to the ISVs for other business needs which is quite evidently posing challenges to run the business efficiently. In the current era, things like BYOD (bring your own device), PAYG (pay as you grow), BYOC (bring your own coverage) have become a trend, which means the networks are getting decentralised. To sustain such requirements at a very faster rate, in a most reliable fashion meeting super tight SLAs may pose a challenge for a DSP to fulfil a plethora of demands.

Another possible scenario to look at would be: many smaller service providers selling the unique, personalised and localised services specific to a customer segment. It would need utilisation of networks of the future like 5G that would deliver very high data rates and ultra-low latency serving applications & services in domains like IoT, AR/VR, driverless cars, high-end gaming, smart health, Industry 4.0 etc. Henceforth, there will be an increased number of transactions -- both technical and financial between providers covering various geographies which may be time-bound as per utilisation.

All of these would be provided by DSPs who own the majority of network resources depending on the type of service delivered on demand, may be shared between different customers types within a service domain.

Given the dynamicity, it would be difficult to manage such decentralised and localised networks.

In such a scenario, telco operations would be a nightmare as centralised view and control would require an intelligent platform to handle e2e network from core, access, and transport with the right set of analytics to offer personalised services and handle the digital transactions. On similar lines, there has been a lot of work done in SDN/NFV space where the standards have matured, and deployments have happened in all the regions across the globe.

Some early day adoptions in domains like SD-WAN, core network (vIMS, vEPC) orchestration have happened, and advancements have been happening in vSecurity space in current times as security is critical to customers across verticals. In parallel, the providers are gearing up for futuristic networks through trials in 5G space, MEC (multi-access edge compute), Cloud RAN and SDNisation of transport networks that bring convergence across IP/MPLS, Optical and Microwave network. All such efforts are done to operationalise the hyperconvergence of decentralised networks and bring hypercloud orchestration across various domains encompassing technologies and OSS/BSS systems.

In such future backdrop, blockchain—a protocol built to manage decentralised systems of value—may play a leading role. To cater such next generation of human contextual communication AI/ML and blockchains jointly would pave humungous advantage for the telecom sector. Though both AI/ML and blockchains have been used separately to do some level of automation for network planning, commissioning, doing the RCA (root-cause analysis) for network & infra related issues; thereby proposing the right action based on the historical set of events. Also, it's been utilised for getting insights about consumer behaviours to promote marketing campaigns offering personalised services. However, the joint potential in telco has not been tested, though many scholarly articles are available from researchers.

As 5G rolls out, networks will atomise, millimetre-wave spectrum is too high-frequency for traditional towers, necessitating network densification and a proliferation of smaller, distributed network access points. As stated earlier, Network Function Virtualisation and Software-Defined Networking telling a similar story, distributing network control and even paving the way for self-sovereign networks. Network-connected devices are similarly multiplying with smartphones and homes, vehicles and fridges, and MVNOs, OTT video/messaging, and even weather-balloon Internet are threatening to distribute industry power.

Many people still consider Bitcoin and blockchain to be synonymous, though little fault of their own. A recent McKinsey article defined blockchain as “a digital system for executing and recording financial transactions,” which isn’t untrue but is roughly equivalent to describing an autonomous electric vehicle as “a machine that can pull itself out of your garage.”

The true impact of blockchain is often found far from the particular use case of digital currency, and telecom executives would be wise to look beyond the financial world to uncover the true value of blockchain technology. That said, because financial companies were the first to understand blockchain fully, a number of use cases for blockchain tech in payments innovation have been developed, some of which are particularly useful to financially pressed telecom companies, like transaction services and micropayments. The boundary between communications services and banking is quickly blurring in developing telecom markets. That said about financial use cases in telecom, there is a huge potential of AI/ML & Blockchain for bringing efficiencies in operationalisation.

One of the prominent use cases to look at would be **Operationalisation of highly distributed Networks of Future:**

One of the biggest breakthroughs would be the pioneering work done with respect to Network Slicing, the prime intelligent engine required for managing such Futuristic networks in telecom. As eMBB, URLCC, IoT services will be the major domains to fulfil on-demand customer needs across Industry verticals. So, an **‘Intelligent network slice management Engine’ based on Blockchain, AI and ML will be truly a centralised platform** that would have an end to end view on distributed networks of future catering to digital services in the connected world. The platform must be fully autonomous and vendor agnostic that can interwork with surrounding systems -- both horizontally and vertically based on open APIs. It must have a completely microservices architecture that can work in plug-n-play format where a function can be turned based on the need of customer requirement and the licensing model requiring to be flexible enough for handling such situation. System would be able to take intelligent decisions for dynamic network management across clusters or segments of use cases or applications across vertical industries (customers).

With an application of AI/ML, this system automatically learns by nature of traffic, latency requirements and allocates required resources in a network slice through a dynamic selection of Policies in Network Slice manager; therefore, creating custom network according to the budget and needs of the customer. Further bifurcation of dynamic network management could be done by the domain.

**Domain aware Network slice Management: IoT, M2M, Consumer, B2B, etc.**

- SLA aware Network Slice:
  - Each of the domain-specific slice can be tied with pre-defined SLA for any domain type which will help a DSP offer premium services to its valued customers without any downtime and lag. In almost real-time the services can be delivered.
- Let’s consider IoT as a broader use case:
  - In low traffic time, the CSPs network remains mostly under-utilised so not being able to take out revenues from the huge CAPEX investments done.
  - IoT applications, like Smart Meter, may need one-time transmission so the dynamic slice could be created in night catering to such applications and later in daytime resources can be given back to business-critical applications.
  - URLCC and eMBB services, which require high BW demands, should have a slice of a network comprising of MEC which hosts both core and Access (vRAN) at the edge for the customers.

Another prominent use case would be **Intercarrier Mobility Management:**

Consumers are quickly becoming device-agnostic—they don’t care if they’re browsing the web via smartphone, smart TV, smart car, or smart fridge, they just want ubiquitous access to content on-the-go. As noted, future consumers may not even care which provider supplies their service. Concurrently, high barriers to entry and low asset utilisation in the telecom industry are making the MVNO business model look even more attractive. 5G will be expensive, and for those players who can’t afford billion-dollar build outs, microtransactions and smart contracts enabled via blockchain may prove invaluable tools for next-generation asset management and leasing. Using blockchain we’ll be rebalancing and amplifying the power of AI and machine learning in the telco market as with billions of connected devices and global mobility of customers there will be an abundant requirement for on-demand dynamic Networks. For example, at some places there is an availability of LpWAN, some have NB-IoT, some may have mMTC (C-IoT) on access side from different providers within a region or across regions. Similarly, on core and transport side as well, there will be unique requirement of resources. Telecoms need solutions to these problems, and blockchain tech for disintermediated international roaming, consolidated digital identity, and securing the “things” may fit the bill.



**Ashu Singh**

is leading the Global Solutions for Telco Cloud and Virtualisation at Tata Communications Transformation Services (TCTS) and has been focussing on innovative solutions around next-gen technologies like Network Slicing, SDN/NFV, ML and Blockchain in Telecom. Prior joining TCTS, Ashu has worked for Cisco Systems, Netcracker Technologies and Idea Cellular Ltd. in diverse roles spanning across Mobile Packet Core Engineering, SDN/NFV Solutions Presales and Prepaid Billing Operations respectively. Ashu, holds an Electronics and Telecommunications Engineering degree from Army Institute of Technology, Pune, India.

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**Email us**

[tcts.marketing@tatacommunications.com](mailto:tcts.marketing@tatacommunications.com)

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