Tech Mahindra

COVID-19
IMPACT ON NETWORK

The COVID-19 outbreak has had a significant impact on people and businesses across the world, forcing them to tackle unprecedented scenarios. Protecting people from infection via social distancing, keeping businesses running by working remotely (for an extended period) etc. While Governments and world health agencies take measures to limit the impact of the pandemic on personal lives, businesses too need to move quickly and decisively to handle this black-swan event effectively. The role of Telecommunication companies becomes even more crucial during such scenarios as they:

- Connect people (via voice, video calls), deliver media & entertainment content by providing higher bandwidth
- · Provide a reliable, secure network for
    - Enterprises to collaborate via remote working solutions (e.g. Zoom)
    - Enabling delivery of critical services (e.g. Tele-health applications)
    - Helping Govt. agencies disseminate accurate information to the public

Massive surge in demand for apps, services necessitates Telcos to re-think their network

This increased dependence on the Telecom business is further ratified by the sharp rise in demand for applications/services running on networks (see image below). This trend is consistent across different geographies (e.g. Americas, Europe, Asia Pacific, & Middle-East-Africa), with some minor variations.

VOICE CALLS
20%-28%

MESSAGING
45%-65%

VIDEO CONFERENCE
150%-200%

STREAMING
30%-40%

GAMING
50%-70%

Telecom companies have created new packages for their retail and business users to address these demands (at no additional cost), while supporting critical services, e.g. tele-health, emergency services etc. However, Telco preparedness in handling this situation is incomplete, unless they take steps to make their network more reliable and robust while ensuring agile and intelligent delivery of services on top of this network.

Key challenges on network and possible approaches to tackle them

Any communication services provider (on mobile, fixed, enterprise network) faces different types of challenges depending on the urgency of the situation. These challenges are shown in below three stages –

- Immediate (first two months of the outbreak): Challenges in this stage are from the perspective of "keeping the lights ON". It includes ensuring employee safety during lock-down situations while allowing minimum to no-impact on service delivered to the customer. Communication service providers (CSPs) would need to have high network accessibility, availability and integrity while withstanding the additional network demand from increasing apps and service usage.

- Near-term (2 – 8 months from outbreak): These challenges are about 'preparing for the future' and ensuring a better network performance in case of a recurrence of a similar issue (i.e. COVID-19). It will be the focus once Telcos are done with the 'fire-fighting' and might involve building on the existing work or taking an innovative approach for networks. Ultimately they need to deliver a network that is simplified (architecturally), flexible and easier to operate at a much better cost performance.

- Long-term (8 – 24 months from outbreak): This stage entails building a network that would enable the CSPs to operate as platform-based organisations, realising use cases such as remote health-care and connected factory. It will be addressed post the immediate and near-term challenges, since it requires significant investment. Focus would not just be on networks performance but also optimising services and customer experience delivered on top of these networks. Telcos would have to take comprehensive measures across the network lifecycle to address all the challenges mentioned above. The summary of which is shown below.

Network lifecycle

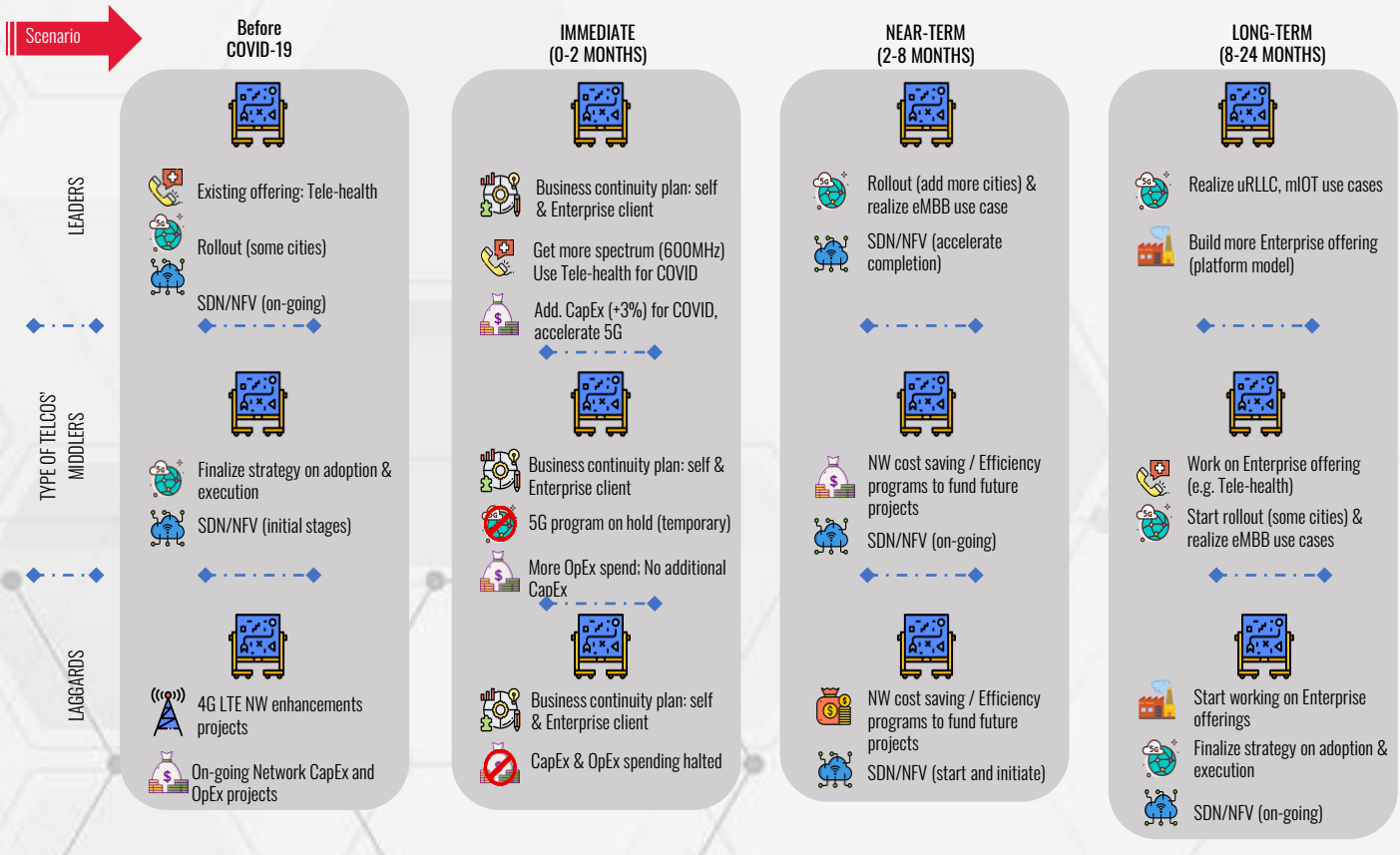
Timeline	Strategize / Prepare	Plan & design	Build & Fulfil	Assure & Optimize
Immediate - Keep lights ON [0 - 2 months]	Business continuity plan Use add. Spectrum for critical services	Network Coverage & capacity augmentation	Partial automation for fulfillment process	24X7 NOC operation (leveraging automation for L1, L2 workforce augmentation)
Near-term - Transformed Networks [2 - 8 months]	SDN/NFV planning 5G use cases - eMBB (FWA)	Telco network cloud (for RAN, Core, Transport Network)	Orchestration for virtual network provisioning	Intelligent NOC automation across network domains SON, DPI etc. for Customer experience improvement
Long term - Fully Evolved Networks [8 - 24 months]	5G Use cases - uRLLC & mIoT	Network slicing with 5G - SA / NSA architecture	Zero-touch hybrid networks provisioning & activation	Intelligent optimization of network & services

Strategise/ Prepare - Phase 1 (Network lifecycle) – The initial stage would start with Telcos acting on their business continuity plan for self and their enterprise clients to ensure employee safety and glitch-free network service delivery. It may include in some cases, getting a temporary license to additional spectrum (e.g. 600MHz) to enable remote working, access to virtual health-care, e-Learning while community practices social distancing [1].

Subsequently, Telcos can plan-out and decide their approach (viz. Vertical, Open, Horizontal) for Telco cloud (leveraging SDN/NFV), in alignment with their business objective, enabling much-needed flexibility and agility in managing networks. Telcos could also look at exploring initial use cases on 5G involving enhanced mobile broadband (e.g. fixed wireless access).

While some CSPs (e.g. Verizon, Telstra) have suggested that, they could accelerate the uptake of 5G in the wake of COVID-19, standard body - 3GPP has deferred release-16 and release-17 specifications to Dec. 2021 [2]. These specs are meant to improve the efficiency of 5G networks and suggest enhancements for uRLLC, mIOT use cases. However, a delay in the spec release would mean a further delay in uptake of 5G.

STRATEGIZE / PREPARE (Phase 1)



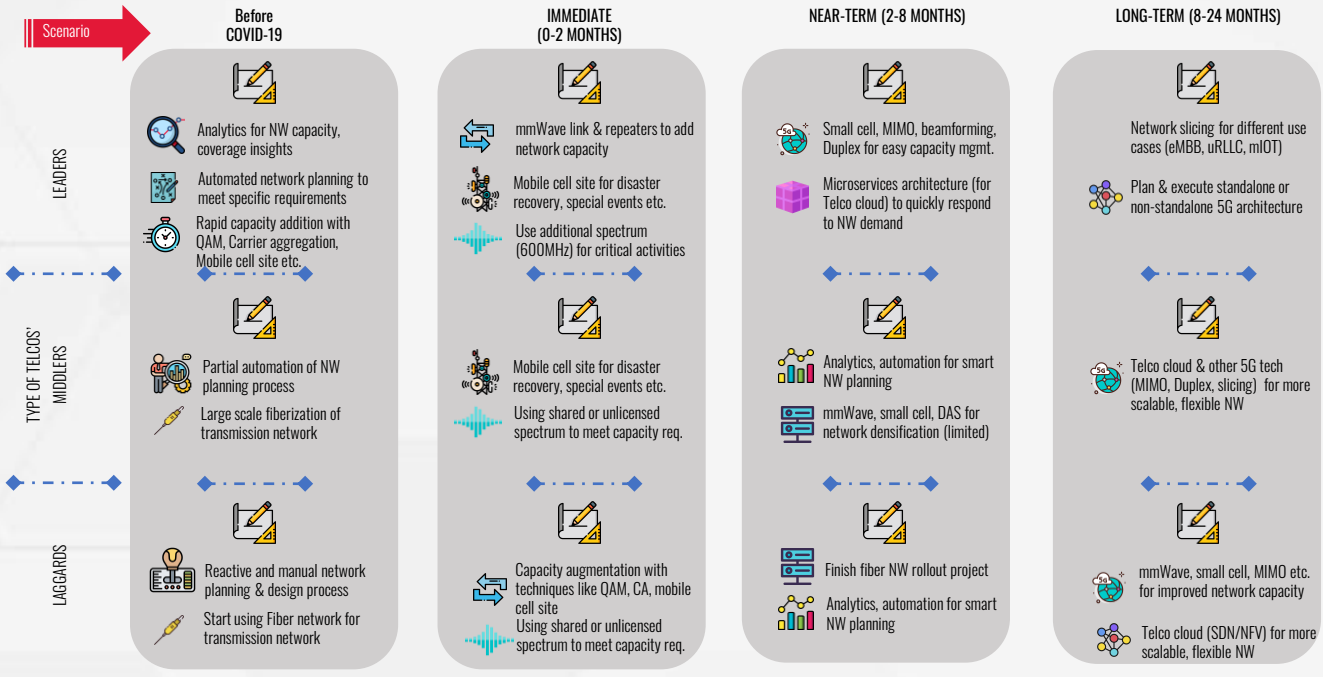
Plan & design - Phase 2 (Network lifecycle) – In case of an emergency like COVID-19, there is bound to be a sudden spike in network demand (as explained earlier), which CSPs current infrastructure might not be able to handle. Hence, Telcos need to augment their network capacity, coverage by adding more bandwidth to meet extra demand and serve critical areas. This can be done in multiple ways for e.g. using mmWave links to overcome lack of fibre connectivity, leveraging cell on wheels / rapid deployment units to serve disaster recovery area, special events etc. or using a repeater to enhance indoor coverage.

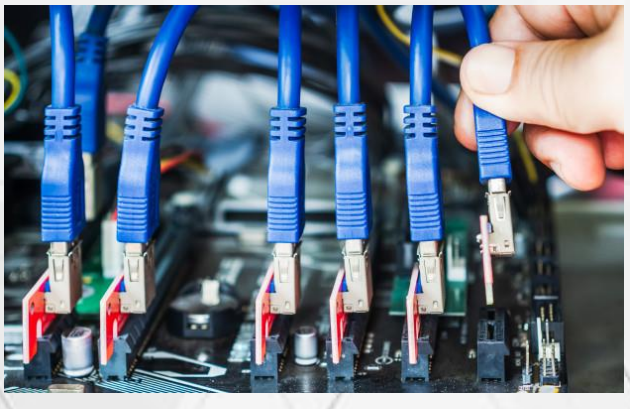
Following this, Telco cloud Plan & Design can be done based on microservices architectural principles. This brings benefits such as - easy update of network (fine service granularity allowing upgrades with minimal impact on other services), extensibility (lightweight service-based interface exposing network capability to 3rd party apps) and faster time-to-market (continuous integration for quicker bug fixes, the rollout of new network features).

The end goal from a plan and design perspective would be to have logical networks customised to specific needs of the application (e.g. enhanced broadband, mission-critical, massive IoT type) while the underlying physical network infrastructure remains same. Network slicing does precisely this and is one of the crucial elements in realising 5G. Additionally, Telcos could adopt a different approach for 5G deployment architecture (viz. Standalone, Non-standalone), depending on the strategy of the CSP.

The effect of COVID on Plan & Design across different types of Telcos and scenario is as shown below.

PLAN & DESIGN (Phase 2)





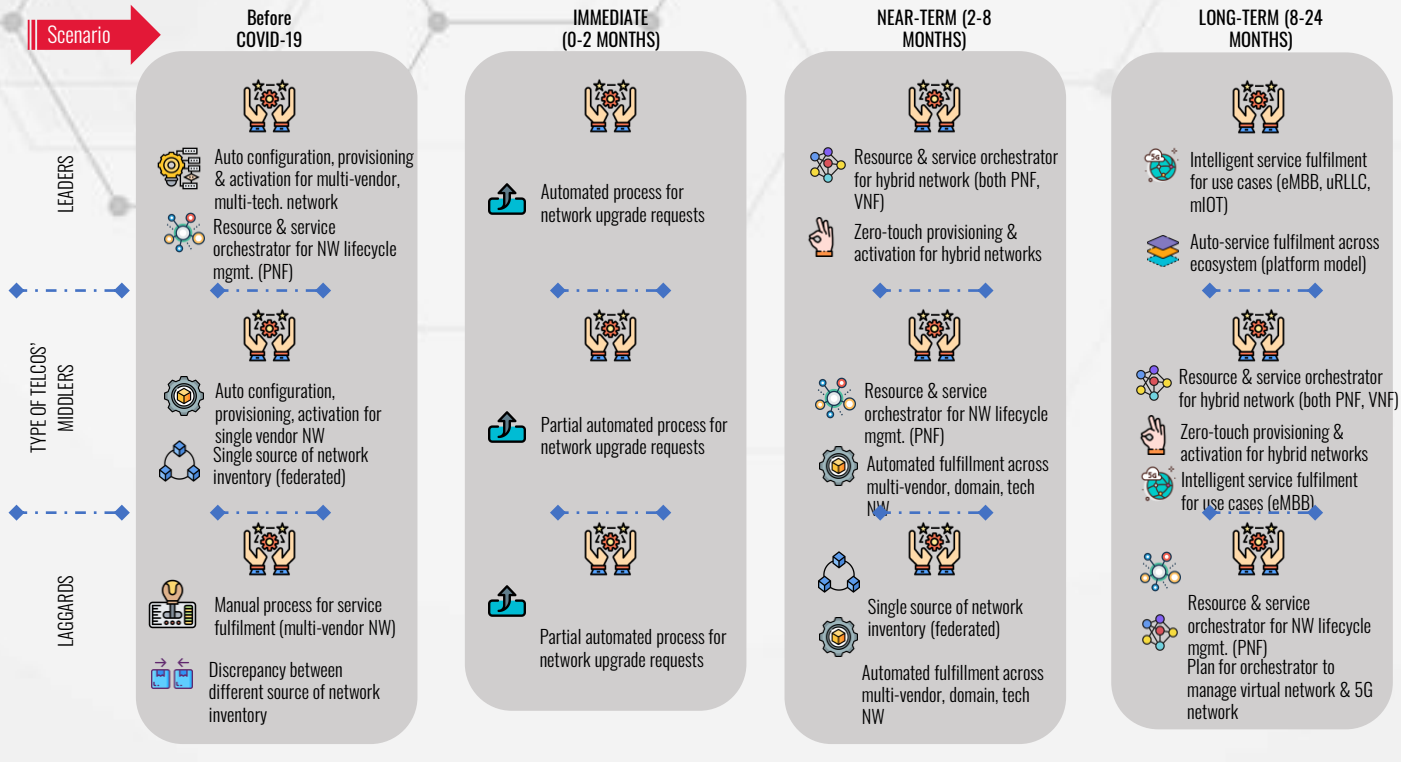
Build & Fulfil - Phase 3 (Network lifecycle) – These activities might also see a small spike during COVID-19 especially in configuring, activation of network plan upgrades, considering most folks will run short of data and need extra bandwidth. Some of these processes could be automated across domains, vendors etc. making the fulfilment cycle quicker and error-free.

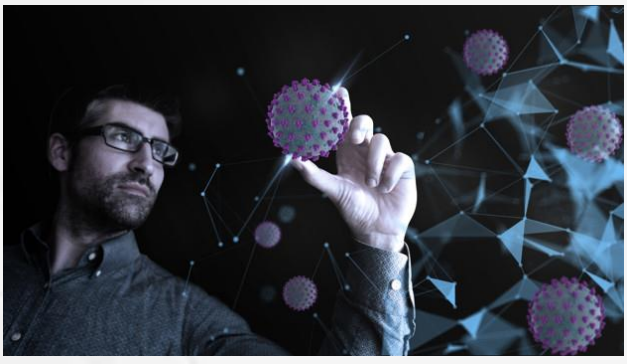
As CSPs move to a virtualised network (cloud) environment, they can finalise the Orchestration solution, to automate the service and resource (VNFs – virtual network functions) lifecycle management. This would deliver several benefits in the form of resource efficiency, service agility (time to market) and flexibility (i.e. responding to on-demand updates) at a much lower cost of operation.

Although CSPs plan to move to a completely virtual network environment soon, they will continue to have both physical and virtual network functions for a considerably long period. Hence, it would be necessary for CSPs to have an orchestration solution that can manage both the PNFs and VNFs build as well as fulfilment cycle, thus ensuring a zero-touch hybrid network provisioning and activation.

The effect of COVID on Build & Fulfil across different types of Telcos & scenario is as shown below.

BUILD & FULFIL (Phase 3)



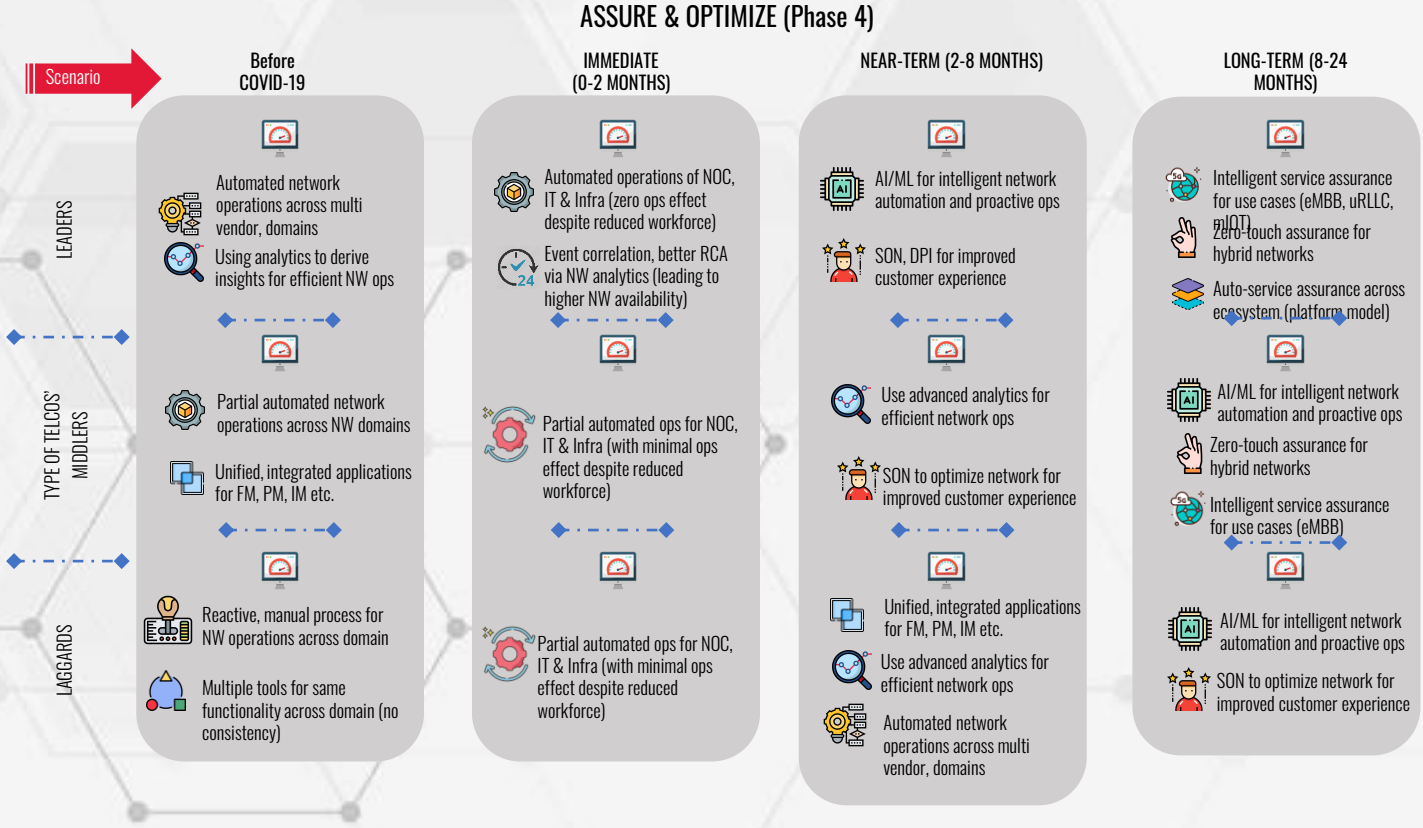


Assure & Optimise - Phase 4 (Network lifecycle) – This phase would probably be the most impacted because of the inherent paradox caused by the COVID-19 situation. The paradox exists since the network demand has increased (as explained earlier) causing the number of events/alarms in NOC (network operations center) to rise significantly, however the availability of resources (L1, L2, L3) needed to handle the events has gone down (due to COVID-19 lock-down). This could lead to a sub-par management of some critical alarms, resulting in more number of network failures, ultimately reducing network availability and hurting customer confidence in the brand. This issue could be mitigated by leveraging automation to augment the current workforce and using the available resources for more complex work, whereas automation could handle rudimentary tasks of alarm monitoring, triaging, ticket creation and task assignment to L2.

An improvement over this would be to complement the automation with preliminary level of AI / advanced analytics to help in event correlation, diagnosis, and ticket classification (thus reducing the efforts needed to be put in L2 level too). This could be done not just for network domains but also for IT and infrastructure operations too. One other area could be using SON (self-organising networks), DPI (Deep packet inspection) to get insights for improving the experience of customers.

The long-term goal of this phase could be to do continuous optimisation of services and customer experience apart from network resources and ensuring proactive zero-touch close loop control thus avoiding any potential event that could hamper the network or services/experience.

The effect of COVID on Assure & Optimise across different types of Telcos & scenario is as shown below.



Conclusion

Thus Telcos' approach to COVID-19 crisis, ought to be well thought through, holistic (i.e. covering all aspects of network lifecycle) and prioritized according to urgency levels (from immediate to long-term).

While the pandemic would cause short term pain, it could also trigger Telcos to alter their approach for managing their business and network. This would bring in a new wave of digitization, that was delayed for significant time, enabling CSPs to truly evolve themselves into platform based organizations that can build digital ecosystems to cater to future needs of retail & enterprise customers leveraging network as the infrastructure.

These benefits would be pervasive across several verticals, and not just limited to Telecom industry, as network of the future is truly the backbone of new age digital economy. As someone rightly said, "The night is darkest just before the dawn".

For more information connect with us at:

NS.Marketing@techmahindra.com

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