ElasticNet™ V3.0, Helping Telecom Operators with Successful Network Transformation

Telecom operators today face a twin dilemma of how to cope with slowing revenue growth whilst the costs of network construction and O&M (Operations and Maintenance) continue to rise, gradually widening the gap between revenues and expenditure.

At the same time, the demand for improved digital services is growing daily, meaning that more throughputs are needed. Telecom operators, constrained by their traditional product innovation and operating modes, must learn to understand how to overcome the challenges they face from Over the Top Technology (OTT) service providers.

The end customers' demand for services is developing into progressively more versatile technologies. So much so that the key to a business’ success has become how rapidly they respond to customer’s requirements in the ever-changing market, and how quickly they can shorten the Time-To-Market (TTM) of new products/services. The existing rigid network architecture, the API-based product Replicate & Duplicate (R&D) mode, and the silos of different functional units in the organization, have become the biggest obstacles for telecom operators on the route to business success. The inevitable outcome must be a holistic transformation from network architecture to operation mode.

In response to this, ZTE Corporation has developed its ElasticNet™ V3.0, and has recently published a technical white paper describing its ground-breaking approach. ElasticNet™ V3.0 is ZTE’s solution for future oriented network transformation, which builds up on the foundation of SDN, NFV, and Cloud computing technologies. It combines the latest global Software Defined Networking (SDN) and Network Functions Virtualisation (NFV) deployment practices and is introduced along with ideas of cloud computing, big data and openness.

ZTE’s idea of network transformation in the ElasticNet V3.0 solution involves triple re-architecture. Network, service and operation are the main focuses of this re-architecture, comprehensively elaborating on the architecture, scenarios and solution of the ElasticNet™ V 3.0 - a 2020 future-oriented network.

The solution also focuses on the dissections of Central Office (CO) re-construction, network on-demand, network slicing and other industry hot topic solutions.
Cloud computing, SDN and NFV technologies are the technical drivers of network architecture evolution. Cloud computing enables dynamic allocation of resources and flexible provision of products and services. SDN separates the control plane along with the forwarding plane, making the network programmable and supporting centralized configuration and flexible management, enabling fast service innovation. NFV, however, decouples software from hardware and virtualizes network functions, which significantly shortens the TTM of new products and services. The combination of these three technologies provides a solid support and driving force to constituting future-oriented elastic network architecture. As a result, they will become the mandatory “go-to” choices of telecom operators for network re-architecture.

As it continues its developments in cloud computing and SDN/NFV fields, ZTE’s newly introduced ElasticNet™ V 3.0 provides a solution for network evolution, suitable for the future expectations for telecom operators. The recent whitepaper also updates on ZTE’s latest deployment practices and research findings, by which ZTE will provide further support on the practice of network re-architecture for telecom operators.

One Center, Dual-Engines & Triple-layer Re-architecture

There are three principal ideas for the future of network architecture from ZTE’s perspective: One Center, the re-architecture of the telecom network which will be cloud virtual Data Center (vDC), centric and cloud will dominate the infrastructure of the new network. Dual-Engines, the facilitation of SDN and NFV technologies that will redefine the cloud-based architecture for telecom networks and drive the evolution. Triple-layer re-architecture, the restructure of the network driven by cloud computing and the fact that SDN/NFV can be illustrated in three layers:

- **Network re-architecture**: To build up a “cloud & network converged” infrastructure layer
- **Network service re-architecture**: To construct a “virtualized and open” service function layer
- **Operation re-architecture**: To compose a “smartly-operated” orchestration layer

ElasticNet™ means software defined networks featuring layered structure, centralized control and unified management, and incorporating SDN/NFV frameworks. This is to be
introduced with ideas of cloud computing, big data and openness. It adopts a triple-layer architecture composed by orchestration layer – MICT-OSTM, service function layer - Elastic Cloud Service™ and infrastructure layer - Elastic Cloud Infrastructure. This is introduced with a multi-tiered DC (Edge-DC, District-DC and Central-DC) deployment mode, and constitutes the operator's target architecture in the form of “Driven by dual-engines of SDN/NFV technologies and centralized managed by the MICT-OS™.

**Network re-architecture: creates a "cloud & network converged" infrastructure layer**

Future networks are gradually evolved to a cloud datacenter-centric new architecture, under which cloud and networks are affecting and merging with each other. On the one hand cloud datacenters provide containers and resource pools for the service control of networks, however, the fast and flexible connections provided by the network enable the formation of a larger cloud-based resource pool for user access and datacenters.

The vDCs powered by SDN are the core points of the infrastructure, and bear telco NFV cloud, IT cloud, enterprise cloud and other cloud services based on IaaS. Along with the evolution of telecom services to NFV and the integration of IT applications, Data Centers become services' containers and the core bearers of the operator. DCs will become the core nodes of the future telecom network, carrying many versions of software and IT systems based on NFV and cloud, and achieve ICT integration.

The SDN-based WANs are the core "connection lines" of the infrastructure. Future network architecture will be able to support fast and flexible network connections. In terms of access networks, there are the SDN-based cloud accessing technologies, cloud interconnection, and backbone network supports. Cloud accessing technology can provide end users with elastic, flexible and fast connections; cloud interconnection technology supports interconnections of DCs over WAN and enables the distribution of tenants across WAN and
migration, and backbone network supports collaborative optimization of the IP layer and the optical layer. Hence, globally supporting optimized scheduling of traffics in order to reduce costs of transmission. Moreover, network capability can be exposed to end users or third-parties through open north-bound interfaces of SDN and the whole industry will be reformed to provide limitless opportunities for business innovation.

**Network service re-architecture: builds a “virtualized and open” service layer**

Network service re-architecture focuses on the reconstruction and integration of traditional Network Elements (NEs) and their service capabilities, including the realization of virtualized NEs in different ways, such as componentization, virtual network functions’ re-splitting and enhancement. In virtualized gateways, for example, the re-architecture focuses on the separation of control planes from user planes (C-U separation). In terms of 5G networks, the re-architecture focuses on the resource aggregation of BBUs’ control planes and the enhancement of service capability by introducing new forms of NEs, such as MEC. ZTE has introduced a Platform as a Service (PaaS) environment for the new NFVs, a category of cloud computing services that provides a platform allowing customers to develop, run, and manage applications without the difficulty of building and maintaining the infrastructure. PaaS enhances the flexibility of “soft NEs” and achieves genuine network function virtualization. Conversely, along with the enhancement of operator’s R&D capability and the maturity of ecology chain, the operators have demands on being able to create innovative services by themselves.

**Operation re-architecture: builds an orchestration & management layer featured with “Smart Operation”**

ZTE’s MICT-OS™ is the brain of the intelligent control of ElasticNet™ and the center of external capability exposure. It is a new generation operation management system featured with unified orchestration, automatic O&M and openness. By referring to the idea and experience of the successful operation and maintenance of IT enterprises, MICT-OS™ is structured based on the technologies of SDN/NFV and Big Data analysis. It is featured with unified service and a resource orchestration management system, integrated development, unified releasing of services and unified allocation of network-wise resources. Elastic scalability is also a major feature, enabling and supporting the operators’ deep
understanding and innovative business transformation innovations, from a network-centric mode to a business experience pivotal mode. MICT-OS™ adopts advanced micro-services architecture, and different functional modules are seamlessly integrated by micro-services components.

ElasticNet™ V3.0 focuses on the implementation of key scenarios

With SDN/NFV technology emerging from trials to commercial launch, the deployment scenarios are becoming increasingly clear. Some of these scenarios have become important cut-in points for telecom operators to introduce new technologies. ElasticNet™ V3.0 includes implementation proposals for these scenarios.

CO Re-Construction

Operators are faced with many challenges and opportunities of network transformation featured by SDN/NFV. Major issues include:

- Reconstructing the large number of existing central offices and legacy equipments
- Utilizing the above physical resources
- How to transform legacy networks into SDN/NFV-based networks

ZTE’s CO re-construction solution provides an approach to transforming existing architecture of Metro Access Network (MAN) to the one based on edge-DCs. The controlling plane will be separated from the forwarding plane. The controlling plane functions such as BNG, CPE and OLT will be virtualized and centralized deployed on edge-DCs, while vCDN and vEPC-U will be further migrated down to the edge-DCs. High-performance commodity devices will be utilized as the forwarding plane devices in DCs and their resources are pooled so that they are able to achieve the future demand for processing ultra-bandwidth. Concurrently, by resource sharing, they are able to reduce the quantity of devices and consequently produce savings in CapEx and OpEx.

Network Slicing
With the impending arrival of 5G, mobile broadband systems will be full service networks that integrate multiple technologies to meet various application needs. 5G Network Slicing is a mechanism that can be used by operators to support multiple occurrences of parallel network functions running on the same chip. This involves 'slicing' the network to support dedicated RATs (Radio Access Technology) targeted at specific application scenarios or business models.

ZTE’s network slicing solution provides the capability of network slice orchestration to approach the network on-demand, experience on-demand, services on-demand and to construct basic network services with lower cost.

By introducing the enhanced NFV ICT PaaS--Cloud Works™, the ElasticNet™ constructs a cloud work capability based on artefacts development, artefacts operation and service management. The cloud work may attract more developers to promote the innovation of personalized and diversified services.

**Network On-demand**

Because of the closed network, it has been a long and difficult process for users to acquire network resources and services on-demand, which has seriously limited the development of these kinds of services. The network on-demand solution provided by ZTE is one of the essential applications for network capability exposure. With it, the customer will be able to acquire on demand:

- Various network resources and services
- The different types of network connection services and network service functions
- Options on location of sites, bandwidths, levels of Qos
- Customized end-to-end reliable automatic leased line services
- Service functions, including NAT, Firewall, DPI

Through service orchestration done by controllers, automatic deployment and rapid adjustment of network services can be achieved to increase the customer experience significantly.
In this cloud-based internet era, telecom networks have become the vessels of the entire information society. ZTE’s ElasticNet™ solution will bring customers a “more flexible, more efficient and more open” experience:

- **Flexible** – the network is equipped with elastic scalability and it can be reformed on customers demands in order to reduce the CapEx and OpEx of telecom operators.

- **Efficient** – supports network resource integration across layers, domains and vendors, increasing resource utilization and expand network service capability.

- **Open** – the network has programmable interfaces which allow third-parties and partners to achieve fast innovation based on the API of existing capabilities of the telecom network, and support smooth transformation of the business mode.

In this era in which almost everything is connected, Industry V4.0 and Internet of Things are driving a massive upgrade of legacy industries. Looking on to the future, these two aspects will combine with the internet and lead the whole society to an enhanced era of cloud. ElasticNet™ V3.0 is an essential part of ZTE’s Multiple ICT (M-ICT) strategy. In the crucial process of network transformation for telecom operators, ZTE will play a pivotal role, together with its global partners and with its spirit of open and ever-lasting discovery, in building a win-win new ecosystem for future networks.