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WHITE PAPER

NEW AGE INFRASTRUCTURE: WHY TETHERED CLOUDS WORK

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Exciting high tech consumer devices and services are built on the bedrock of infrastructure that can service emerging business paradigms. Such infrastructure is needed to power the digital transformation telcos are witnessing with the launch of 5G. It is also needed within the power sector, where an energy transition is being driven by the urgency of the global warming problem and the subsequent need to reduce emissions. Both sectors, therefore, require advanced, robust, resilient infrastructure to support the new sustainable, digital lifestyle.

By mid-2022, 5G had been launched, deployed or was in roll-out across most of the world[1]. According to the Global Mobile Suppliers Association, around 70 countries had 5G networks as of June 2022, up from just 38 in mid-2020. Most use cases that make 5G so exciting require low-latency high performance networks that necessitate small cell architectures in dense urban clusters. To help networks meet capacity and latency requirements for 5G, fiberization or fiber-only transmission is essential.

Energy networks are in the middle of their own transition as they move from a blend of traditional energy sources to distributed generation – from the likes of renewable sources, energy storage and microgrids. Power supply companies also want to offer consumers a greater say on energy choices (between fossil fuel and renewables) and consumption patterns (through peak/off peak variable billing). Managing these complexities requires increasing automation of controls with decision data streaming in from sensors, traffic management systems and IoT devices. So once again, there is a need for high performance, low latency networks.

Plus, the two sectors are interconnected - telecommunication facilities utilize energy infrastructure by means of radio access and antennas, base stations, data centers and many more, whereas energy facilities harness telecom infrastructure to communicate through interconnected devices, security control and advanced storage and grid systems. The intersection extends to consumers as well. Customers today have the option to explore combo offers, say power and internet, as a bundled offering from the same company portal or company mobile app – this demands innovation not just at the application or system level but also at the deployment and architecture level as well. In the context of net zero, such deployment infrastructure has to be energy efficient as well.

In this context, enterprises need to look closely at two emerging cloud models

(i) Collaborative Cloud Building Strategy, where cloud extension is mostly done through nearshore datacenters and edge computing

(ii) Industry Cloud Applications where cloud extension happens in vertical stacks that can fast track the transition.

Collaborative cloud building strategy

While cloud platforms continue to grow, the arrival of 5G and other advanced market solutions where key parameters like performance, reliability and latency matter the most demand a slightly differentiated strategy. Traditional cloud networks must be upgraded to hyperscale architectures to meet the high-end storage, computing capacity and elasticity demanded by the new applications. But this cannot be done by purely augmenting cloud capacity. New and futuristic applications such as autonomous cars, an IoT enabled home, AR/VR and streaming services cannot function with the kind of latency that is a given for in-demand cloud services unless, of course, the cloud infrastructure build-up is an unlimited budget project – which they seldom are!

To deliver low-latency, highly reliable and secure services, computing resources must be closer to where the data is. Organizations with distributed operations/customer bases can look to datacenter colocation services and edge computing. With edge computing, real-time data is processed near the data source, considered the 'edge' of the network. Edge computing eliminates the lag time and saves bandwidth by bringing data and computing power closer to the device or data source where it's most needed. Edge networks can be built on co-located datacenters close to customer locations to deliver a connectivity model that delivers more for less.

Utility companies are also looking for similar solutions, including colocation driven by grid optimization and the multitude of distributed energy resources seen today. Such distributed energy sources, many of which are renewable energy based, are optimally located for generation rather than distribution and are connected to power supply grids through energy interconnectors. Such interconnectors are crucial for international energy sharing and energy trade. Mostly, electricity interconnectors run underseas like telecom subsea fiber networks that provide the backbone for basic internet services. But as the mesh of such connections increases, massive data load comes in from multiple sensors attached to generation and demand estimation equipment. Collaboration between cloud and edge computing is paramount for processing such massive loads on a grid.

These new deployment architectures require businesses to look beyond their traditional understanding of the edge[2]. A growing number of companies now see that the flood of new data — gathered and managed at the edge — will be crucial. This information will drive efficiency, and it will provide real-time customer analysis that allows companies to make smarter decisions and potentially create new business models. To get there, edge solutions must deliver on certain key parameters. They must be able to:

- Centrally manage and automate functions in order to deliver the needed speed, agility, and intelligence.
- Dynamically determine the priority of network resources, path selection, and policies in a highly adaptive way based on the importance of business applications.
- Allow the handling of traffic routing across multiple transport options to multiple destinations, such as a software as a service provider, public cloud, or private cloud.
- Perform artificial intelligence and analytics tasks and quickly engage users in a smart way to deliver a superior experience. That approach can include interactive bots, self-healing, and predictive intelligence.

Such a technology transformation at the edge is being powered by network and computing technology improvements such as software defined WANs, Multi-access Edge Computing (MEC) and advances in computing power. While software defined WANs ensure application-aware, agile and secure networks that can be provisioned, orchestrated, and managed from a central console, advances in computing power support lower latency and enhance system performance. MECs also positively impact latency issues – typically deployed alongside 5G (though not exclusive to it), MECs cut the long, often imperfect network path between devices and servers to deliver a better end-user experience. The Infosys Multi Access Edge Computing (MEC) Solution for instance helps create best of breed 'software-defined MEC solution' with a Lego block-based architecture ensuring flexibility for customers to select the components of choice.

With network assets spread wider in new age power and telecom grids, preventive maintenance is key. In this space, Infosys has developed a drone led inspection system with edge computing capabilities[3]. Drone fleets can be used to inspect assets in remote areas with hostile weather condition or those that span large distances (like pipelines/rail networks). The inspection management system is capable of deep rescanning while collecting continuous imagery of anomalies for further processing and remediation. This ensures timely arrest of any aberration in a pro-active manner, forestalling costly losses to life, property or the environment.

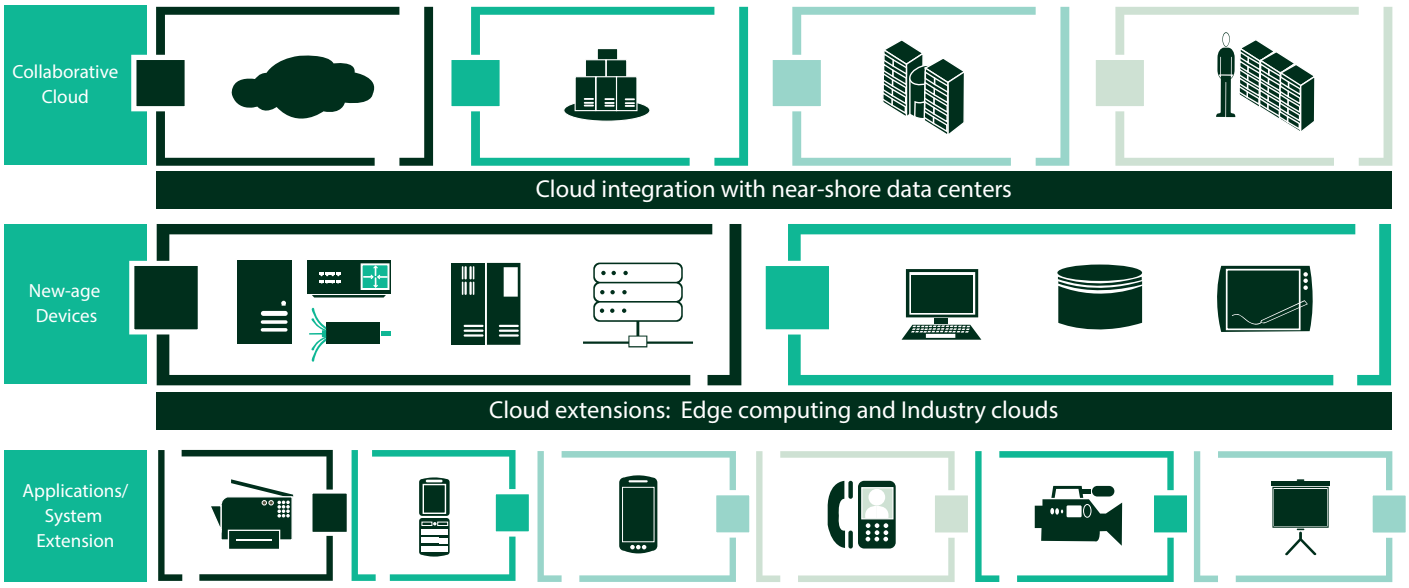

Figure 1 New Age Infrastructure

Industry cloud applications will drive the transition

Once the cloud joins hands with nearshore facilities to facilitate advanced services, a software driven approach with rich functionality becomes important for the smooth functioning, tracking and automation of applications while ensuring improved ROI. This can be delivered by industry cloud frameworks that marry robust hardware and connectivity with domain-specific functionality. Foundation components common to businesses within a sector can be addressed within such industry clouds, allowing enterprises to focus on building business differentiators. Such a play helps efficient pay-as-you-use scaling without disrupting digital transformation.

This is particularly important for enterprises running on business processes unique to a domain that manufacture and deliver products and services following an order to fulfilment journey with varied lifecycles. An industry cloud model can support many business scenarios, including for example a vendor model for offnet sales – such a model has to incorporate rules for in-transit cost/margin analysis and manage multi-country, multi-currency quotation, sales and pricing. It also needs to incorporate application-level integration with the financial system for purchase order details and the billing system to ensure invoices are generated at the defined bill cycle – such integrations require robust integration patterns and techniques, mostly based on low code and no code so that business driven changes can be expeditiously incorporated into the IT platform. Such dynamic business systems which are responsive to the pressures of customer demand and business lifecycles are supported on vertical industry clouds running best-in-class applications on hyperscalable stacks.

Creating a successful industry cloud platform is all about robust planning and technology understanding – both are key to the design of the product repository and integration services. An industry cloud data model also requires a meticulous strategy to plan the migration from the existing cloud platform to the industry cloud platform. It could also involve complex asset migration from legacy applications. Based on the Salesforce Industry Clouds platform (erstwhile Vlocity Communication), Infosys has rich experience delivering turnkey solutions built around industry cloud platforms. Salesforce now offers 12 industry clouds, including in communications, energy and utilities. This broad product coverage is complemented by what the Infosys Salesforce Practice offers - experienced domain specialists and deep cloud technology experience. In addition, our state of art framework-based offerings and virtual living labs are geared to deliver colocation and other infrastructure services for communication and energy companies.

Salesforce industry cloud platform for utilities as well as communication service providers can be used to sell corresponding products and services with appropriate pricing based on bandwidth, SLA, latency, protocol, contract type and many other parameters. There are rules to maintain product relationships, and mandatory/optional internal and vendor specific components including cross connect components. Billing and contract related information can be configured along with network services, thus ensuring a seamless order journey on the Salesforce platform.

Such journeys are only possible within tethered clouds. In essence, the cloud cannot float free and still support the low latency and high responsiveness that are the hallmarks of new generation infrastructure networks. Instead, it needs to remain tethered to earth-based data hubs that place data storage and computing resources near end users. The pillars of this cloud-and-hub architecture will be a collaborative cloud building strategy and industry cloud platforms. Together they can finally set free the potential of new infrastructure pipes and deliver on the wildest of customer dreams.

References

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