SUSE

White Paper

Vision for Telecom at the Edge – Adaptable Edge Computing Infrastructure

Introduction

Our vision of the next generation of telecoms infrastructure is one of 5G and Edge computing enabling a new class of novel applications and use cases. At SUSE, we are preparing for this dynamic future by building an adaptable edge computing infrastructure platform that can support the applications of today and tomorrow.

5G Goals and Trends

5G promises to deliver not just a new generation of connectivity with Enhanced Mobile Broadband (eMBB) services but also to enables new classes of application in Internet of Things (IoT) and Machine-to-Machine domains. From the futuristic promises of Extended Reality (XR) headsets and the metaverse to more incremental improvements to day-to-day life enabled by smart cities, 5G will enable a more connected world.

5G aims to deliver this by offering three key enhancements on previous generations of mobile technology – higher bandwidth, lower latency, and greater device density. Combined, these will allow for not only improved versions of 4G services but also new capabilities in Ultra Reliable Low Latency Communications (URLLC) for autonomous systems and Massive Machine Type Communications (mMTC) for connecting billions of Iot devices.

In truth, as an industry, we don't necessarily know how these capabilities will be utilized yet and everything that people will build on top of them. If history is a guide, the companies that will stand out most in this space are still in their infancy. It would not have been possible to forecast the industries, applications and companies that were enabled by 4G at this point in its evolution. The internet has always enabled permissionless innovation and we should expect 5G and Edge computing to follow that history.

As such, our role in the telecom industry today must be to deliver modular and flexible platforms which can quickly adapt to the evolving requirements of the industry and our customers.

Case for Cloud Native in 5G world

While we cannot say what the applications people build will be with any certainty, we can begin to describe some of their characteristics, the way they will be built and the core features that will underpin them.

We can, for instance, say with some confidence that these applications will be designed in line with cloud native principals, as defined by the CNCF, and they will rely heavily on open source software for many of their building blocks. This trend towards established modern software development methodologies will enable more agile delivery and greater feature velocity compared to past models.

We can also adopt these principles as we build out the networks which will support them and transform our own environments, a process already well advanced with 5G core and Open RAN, for instance.

This can be illustrated in the nature of the 5G specifications, focusing on a service-based architecture (SBA) and a transition from hardware first to software first mentality. Equally, the rise of Open RAN (ORAN) and the disaggregation of the radio network show the same trends in action.

Operators need Flexibility

Hardware will have a place in the network for a long time to come. After a decade of NFV development we still see that hardware-based solutions offer significant performance benefits for user plane traffic in many scenarios. However, that decade has also shown the potential of software solutions to offer greater agility and flexibility to operators, allowing new features to be delivered without ever touching the physical site and dramatically changing the process of scaling infrastructure in and out. Finding the right blend of approaches is a key requirement for Operators.

Beyond the infrastructure layer, initiatives like Operator Platform from GSMA illustrate how we can collaborate as an industry to offer global solutions to our customers federated from many underlying networks.

Where does SUSE fit and How?

SUSE is focused on building and managing the infrastructure layer of this stack, sometimes described as the 'Container-as-a-service' (CaaS) or 'Infrastructure-as-a-service' (IaaS) layer. This layer is concerned with the deployment, scaling and management of containerized applications such as the components of 5G Core or Open RAN. In this domain, it is becoming clear that the common standard for the management of containerized applications will be Kubernetes, an open-source project.

The Ecosystem will Drive Success

Our role is to put in the hands of operators and vendors the tools necessary to deploy, scale and manage these Kubernetes environments. We acknowledge that our focus is only a component of a working network. It is critical that we collaborate with vendors and partners

to deliver the totality of the network and achieve business outcomes.

Architecture Pillars

As we deliver our components of the stack, we are guided by several principles we see as being key to the Telecom architecture of the future.

Hybrid Environment

The architecture will be a hybrid environment in multiple ways. Operators will manage thousands of clusters spanning a variety of vendors, configurations, and sizes. These will be spread across public, private and edge cloud deployments.

Management of containerized applications

Kubernetes is the settled choice as a common standard for managing workloads. We should leverage this commonality and the extensibility of the Kubernetes architecture to manage as much of our environment as possible through the same framework and paradigms. As an example, community projects such as Cluster API aim to do this for deployment and scaling of Kubernetes itself.

Everything as a workload

SUSE has developed open source tooling to manage the operating system on the host itself as a Kubernetes construct, enabling you to treat the OS like a workload. As a result, you don't need onsite technical expertise to onboard and update or dedicated staff to manage the operating systems on edge devices. This frees up resources and streamlines operations, as you can manage the full lifecycle of edge devices from one dashboard.

Interoperability across vendors and architectures

Single-vendor environments will be increasingly difficult to sustain and increasingly sub-optimal in capabilities compared to best-fit technology from multiple vendors. We must architect with modularity in mind for all components to ensure operators can always choose the ones which work for them.

Telecom architecture has always been complex, given the requirements it needs to meet. The transition to cloud native software based solutions adds additional complexity and asks operational teams to manage new technology with unfamiliar paradigms. To enable success we can aim to make this a seamless experience across multiple vendors, clusters and environments using well designed management solutions.

Both Public-cloud and Private-cloud have a place

Public cloud is a fact of life and must be embraced in practical ways. There are scenarios where there will be a clear case for public cloud and others where private cloud will make more sense. Allowing the flexibility to use both is a key requirement. Embracing public cloud must mean more than using it as a source of compute and other basic resources; high-level cloud

services they provide, such as Kubernetes, must be embraced, too.

Portfolio approach

We offer a portfolio that explicitly speaks to the edge – we view that no one platform can address every requirement and offer different solutions tailored to small footprints environments or datacentres.

Conclusion

Our vision for the next generation of telecom infrastructure is that 5G and Edge computing will enable a new class of novel applications and use cases. From the futuristic, step change, advances promised by augmented reality to the practical improvements to our day to day lives of smart cities, we don't know everything that people will build with 5G, but we know it will be based on open source and cloud native principals to enable more agile networks, greater feature velocity and a larger vendor ecosystem.

At SUSE, our role is to enable this by delivering flexible, adaptable infrastructure to support these applications and the networks which enable them. We solve the challenges of managing large numbers of diverse and varied clusters scattered across public and private clouds. We do that while delivering the feature set and security posture you would expect from a vendor who has been delivering business-critical Linux solutions for more than 30 years.

To learn more, visit Edge Solutions, Telco Industry Solutions

Or

Contact us at https://www.suse.com/contact/

Deutsche Telekom, one of the world's largest telecommunications companies is using SUSE Edge solution, to modernize Telecom Edge infrastructure using open standards – Kubernetes and Linux.

SUSE

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Thank You