

A Cloud Native Journey for Telecommunications

How to reap the promised benefits of cost savings,
rapid deployment and customer empowerment

Agility through Cloud

Nothing has been more of a stimulus for agility than the cloud, especially for the webscale companies whose services pose the greatest threat to the telco industry.

Why is Cloud Significant?



Provides businesses the ability to rapidly develop, test and launch software applications that drive business growth at a rate and scale not seen before



Through virtualization Cloud enables the abstraction of the IT stack so that one physical resource is used logically like many, creating more flexibility and scalability, and opening the door to new service models



The addition of automation further allows the focus on other issues such as core business logic, security, and analysis, as opposed to just provisioning and maintaining the resources

All of this together supports the “anything-as-a-service” paradigm of cloud driving a mostly static and transactional world into a more dynamic and subscription-based economy.

Agility describes the ability to move at speed and change direction, all while maintaining balance and control. Without agility, a business faces disruption, or even worse, commoditization.

Early Attempts at “Cloudification”

Although Network Function Virtualization (NFV) became the predominant way the telecommunications industry sought to leverage cloud, the innate complexity of NFV is far from the agility and automation of an authentic cloud.

There is an inherent difference in the design philosophy of traditional telecommunications NFs compared to most SaaS software. The functional architecture found in many network domains causes difficulties that prevents agility such as:

- complex dependencies between configurations for multiple functions, which then have dependencies on component lifecycles
- application endpoints which cannot be decoupled from underlying resource lifecycles
- interfaces that don't lend themselves to service discovery, load balancing or otherwise enable the elimination of configuration dependencies

There is an inherent difference in the philosophy in which some of the SaaS software of today is designed than that of traditional telecommunications NFs of the recent past.



The People and Process Story

DevOps 1.0 has been mostly centered on harmonizing the interplay of development and operations with the goal of institutionalizing continuous delivery. In DevOps 2.0 we see the emergence of adaptive feature delivery and the broadening of scope to nontechnical teams.

Time for DevOps 2.0...

In DevOps 2.0 we see the emergence of adaptive feature delivery and the broadening of scope to nontechnical teams. Business adopts cross-functional methods to ensure that software is iterated on a continuous cadence complementary to marketing and sales campaigns.

DevOps 2.0 elevates security as a fundamental element from beginning to end with the mindset everyone is responsible for security. This is sometimes referred to as DevSecOps. By thinking of security as code, security specialists are given the tools to contribute value with less friction.

The relationship where the development team “throws code over the wall” to operations led to the classic battle of: “it’s not my machines, it’s your code,” vs “It’s not my code, it’s your machines.” Coined by a presentation at O’Reilly Velocity in 2009, a new process approach for cloud arose in response—DevOps.

Cloud Native with Oracle Communications, Better Software for a Better Cloud

The Cloud Native Computing Foundation (CNCF) is an open source software foundation dedicated to making cloud native computing universal and sustainable. Oracle is a platinum member of the CNCF in the realization that its vision of an open, cloud native and standards approach is well aligned.

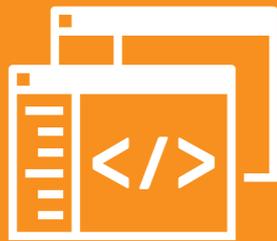
With a rich heritage in telecommunications, Oracle Communications has a deep understanding of service reliability. Developing applications in this space has placed an emphasis on creating foundational platform services whereby applications could be built consistently to these expectations.

There has also been a keen awareness of the operational aspect of these applications. This has become even more pressing as the applications move to SaaS-based cloud delivery. It is this space, where Oracle's leadership with cloud technologies like those of the CNCF, which has given Oracle Communications new perspectives on 8 core principles for successful cloud native operations.



Eight Principles for Successful Cloud Native Operations

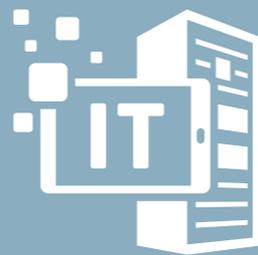
1



System Immutability

Everything, software and configuration, is code. All changes are made through CI/CD where they are deployed as immutable artifacts. No manual configurations or customizations are allowed. This makes it easier to implement the principle of least privilege as there is no need to run scripts in the production environment. Also, any changes not coming through the delivery pipeline can be considered malicious.

2



Automate Everything

All aspects of build, test, verification, and deployment are automated. This includes activities such as backup, recovery, password/key rotation, etc. Fully automating the DevOps pipeline (including verification and testing) removes much of the potential for human error, allows changes to be applied to the environment with confidence, and provides for rapid repair.

3



Disposability

All services are transient and treated as short lived. Instead of focusing on never failing, services are designed to go up and down quickly without service interruption. Regular repaving (re-deployment) of the environment ensures failed or failing services are removed and new ones deployed.

4



Externalized Configuration

Configuration (including passwords, credentials, location of backing stores, etc.) is decoupled from the software image, and like software, can be treated as a build artifact in a controlled and versioned manner. Versioned configuration enables development and production parity as an artifact, and can eliminate costly operational errors.

Eight Principles for Successful Cloud Native Operations (con't)

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Logs as Event Streams and Constant Telemetry

Everything needed to debug or diagnose any functional, operational, or security issue are in logs, traces, or metrics data. These are treated as a stream of time-ordered events and stored in a centralized collector outside the system where better threat monitoring, forensics, and diagnostics can occur through event correlation or analyzing the aggregated and holistic view. Constant telemetry is fundamentally enabled through logs as event streams and thus the two should always be considered together.

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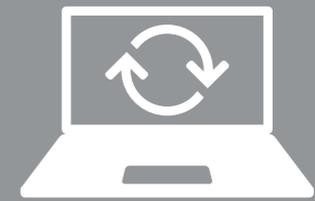


Delegated Governance

Some shared aspects of the environment are centrally managed like networking, identity management, or infrastructure, but in a true DevOps fashion, teams delivering a service are responsible for operating the service. This is allowed only with strict governance, enforced through checks in the Continuous Delivery pipelines, giving greater control over rate of change. Business agility is improved as applications have better visibility into the operations of their service with tighter feedback loops that ultimately improves quality.

7

8



Independent Lifecycle

Independently upgrading, scaling and deploying each Microservice is paramount for supporting other cloud native principles as well as minimizing the amount of change in the system at a given time. Furthermore, such decoupling makes other principles such as repaving easier as well as promoting easier isolation of issues.

5G Embraces Cloud

Historically, network applications have been defined using tightly coupled components which interacted through long-lived, stateful protocols. However, with 5G, 3GPP has now embraced the patterns found with Representational State Transfer, or REST, through defining its next generation core with a Service Based Architecture (SBA). In this architecture, control plane capabilities are exposed as discoverable services with RESTful APIs. This will enable a much faster pace of innovation as new capabilities can be introduced and existing ones can be easily consumed in new ways without the need for defining new point-to-point interfaces or making difficult changes to existing protocols stacks and state-machines.



Future of Cloud for Telecom

We have seen the cloud evolve from a definition of five basic characteristics to something that is now an entire landscape of technology with an accompanying operational philosophy. To pin that down today it would have to at least have the following:



Containers—more than virtualization, rather a rich ecosystem of services to orchestrate, schedule, network, deploy, and maintain the containers



Microservices—more than smallish applications. They require a different way of thinking about the service, how resources are used, how state is persisted and working in a distributed environment



DevOps—A a cultural shift of unprecedented magnitude and not just a token gesture between two organizations



Continuous Integration and Continuous Delivery—more than having some cookbook with scripts. They are a pipeline that spans all aspects of creating and running a service, embracing automation at every step, and strict governance—literally turning the business into code

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Delivering SaaS as Cloud Native

Bringing this all together is not trivial. It literally takes a platform in of itself to enable the delivery of SaaS as cloud native on an agile cloud. Oracle Communications has devised a Cloud Native Environment Platform-as-a-Service (PaaS) to capture all of these aspects and more.

Oracle Communications has taken a fresh approach to SaaS based services, designing an architecture that enables slice-as-a-service, built entirely from microservices that support the service while still maintaining the external interfaces per 3GPP standards.

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