



WHITEPAPER

# **AUTOMATION AND CLOUD-NATIVITY**

HOW TRULY CLOUD-NATIVE SOLUTIONS  
LEVERAGE AUTOMATION TO INCREASE  
RELIABILITY AND COST-EFFICIENCY

BY

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# ABOUT THE AUTHORS



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Abdel is a Principal Architect in Google Cloud focused on the Telco industry and customers, his background includes Telecommunication and service providers' architectures both wireline and wireless, and its evolution in the last 15-20 years. His focus is on helping customers through their cloud and digital transformation journey, and how Google Cloud can offer the cloud-native platform for Telco customers and vendors to evolve and transform their architecture and business models as well.



## **Behnam Hooshiarkashani | VP of Cloud Services, ng-voice**

Behnam has more than 11 years of experience in the industry and extensive knowledge in DevOps, Kubernetes, Helm Charts, and Ansible. As ng-voice's VP of Cloud Services, he leads the Cloud Native Team, making sure our entire solution runs on the cloud as well as improving our software's life cycle through our CI/CD pipeline.



## **Elijah Indarjit | Customer Solutions Architect, ng-voice**

Elijah has vast experience in the telecom industry working for companies such as Vodacom South Africa and Vodafone Turkey deploying VoLTE interconnected networks and developing a Core network strategy and evolution, resulting in better service quality for customers. As a Solutions Architect, he brings his skills to design solutions and evolve our portfolio based on customer needs.

# ABOUT THE AUTHORS



ng-voice is a Germany-based telco software supplier with a global footprint that is committed to building the next generation of 100% software-based mobile networks. Combining DevOps with telecommunications expertise, ng-voice is creating innovative mobile infrastructure solutions and making them accessible for communication service providers and enterprises of any size that want to deploy future-proof networks.

ng-voice's flagship product – the fully containerized cloud-native IMS – is the first 100% containerized and Kubernetes-based fully-fledged IMS solution for VoLTE/ VoNR with under 25MB of container image size that is completely cloud and infrastructure-agnostic. With a high automation level and minimal resource footprint, it reduces costs and optimizes the entire life-cycle management of the application.

For more details visit [ng-voice.com](https://ng-voice.com)



Google Cloud is a market-leading solutions and strategic approach to help organizations build their data clouds, open infrastructure clouds, collaboration clouds, and trusted secure clouds, all with sustainable technology and solutions. This enables organizations to invent new ways to achieve their goals using the cloud, and accelerate their digital transformation journey.

A transformation cloud is a new approach to digital transformation. It provides an environment for app and infrastructure modernization, data democratization, people connections, and trusted transactions. It is built on an easy-to-use platform with customized industry solutions that gives organizations the confidence that they are saving money and are helping create a more sustainable future for everyone. In short, a transformation cloud gives an organization and its workers the ability to take advantage of all the benefits of cloud computing to drive innovation.

Anchored on Google leadership in building scalable infrastructure globally and data and AI, Google Cloud Platform is a suite of more than **100** products and services spanning compute, storage, networking, data and AI/ML domains and **more** that help organization adopt the cloud era in seamless approach.

For example, our modern cloud infrastructure is based on Kubernetes at its core and our strong support for Istio and KNative have formed the base of our leading services like Google Kubernetes Engine (GKE), our managed application platform with Anthos, Cloud Functions, and Cloud Run. We have also contributed more to the open source community than any other cloud provider, more than doubling our efforts over the last 5 years and making up more than 50% of the contributions to the Cloud Native Computing Foundation (CNCF).

For more details visit [Google Cloud](https://cloud.google.com)

# WHITEPAPER

## AUTOMATION AND CLOUD-NATIVITY

### HOW TRULY CLOUD-NATIVE SOLUTIONS LEVERAGE AUTOMATION TO INCREASE RELIABILITY AND COST-EFFICIENCY

ABDEL IBRAHIM, BEHNAM HOOSHIARKASHANI, ELIJAH INDARJIT

## EXECUTIVE SUMMARY

Advancements in technology have opened up a variety of possibilities for telcos to deploy their services differently. Efficiency, agility, flexibility, and reliability have become essential components for many services, and telcos must keep pace with these new approaches and new technologies to meet the increasing demands on their services.

Automation is a term that is used frequently in technology, with many providers in the wider IT space leveraging it to improve overall service quality. In fact, **more than 30% of organizations foster automation across five or more departments.**<sup>1</sup>

For telcos, often held back by legacy network infrastructure, automation could be the answer to minimizing manual tasks, improving the quality of service, and streamlining the overall development and deployment process. It can help to redefine and reinvigorate services, by minimizing the time and cost of activating and provisioning said services.

But automation alone does not make a modern telco. Indeed, automation must be supported and surrounded by other new technologies and approaches to really see telcos reap its rewards. Cloud-native development is one approach that aligns ideally with automation and as mentioned by **Tariq et al., in an article by The Linux Foundation's project Nephio, this approach is critical to realizing the promise of cloud transformation.**<sup>2</sup>

When used hand in hand with cloud-nativity, automation creates myriad benefits for telcos. It assists in minimizing the complexities of deployment in cloud-native applications and allows for continual development of software.

Telco orchestration and automation in the cloud-native era is poised to major transformation, where it will be intent and developer-centric model instead of traditional infrastructure as code model, which will open a myriad of possibilities to address the new digital and tactile services era in the 5G world and beyond, where integration of different network functions from different best of breed vendors to address specific use case becomes feasible and easier to deploy and run, and integration of AI/ML capabilities becomes smoother to integrate as well.

In this white paper, we'll explore how automation unlocks the true principles of cloud-nativity and its benefits to both operators and their subscribers, and explore its importance within a CI/CD (Continuous Delivery) pipeline. We also analyze the benefits of automation in practice with the use case of ng-voice's IMS deployment in Google Kubernetes Engine.

#### References:

1 - Workato. W\*rk Automation Index 2021. Workato, 2021, <https://discover.workato.com/work-automation-index-2021/p/1?ref=connector-automation-stats>. Accessed 22 November 2022.

2 - Tariq, Sana, et al. "On the road to public cloud 5G networks – Nephio." Nephio, 13 May 2022, <https://nephio.org/on-the-road-to-public-cloud-5g-networks/>. Accessed 24 November 2022.

# THE PRINCIPLES OF TRUE CLOUD-NATIVITY



Cloud-nativity is a broad term, used widely within the technology sector. It can enable a variety of technologies, and often has varying definitions. In the words of the Cloud Native Computing Foundation (CNCf), the **definition** of cloud-native technologies are those that “**empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach**”.<sup>3</sup> The true value in being cloud-native is thus as much about how it is designed as it is about where it is deployed.

Therefore, to embrace true cloud-nativity, there are a number of principles telcos should adhere to:

**Cloud-agnostic** – key network components—for example, an IMS core—must be able to be deployed in any cloud environment, whether that be public, private, or hybrid.

**Load balancing** – cloud-native applications should have load-balancing capabilities, to monitor load and capacity requirements in real-time, and adjust capacity as necessary to ensure consistent and reliable performance.

**Self-healing** – to minimize potential downtime, cloud-native applications should have ‘self-healing’ capabilities. Applications should continually monitor to identify any faults or bugs, and roll out repairs automatically.

**CI/CD** – utilizing automation through the entire process, from integration to delivery, to deployment, to improve service and develop offerings.

**Auto-scaling** – to provide an optimal user experience as well as to reduce costs, resources are automatically added when needed and can scale to meet fluctuating user demands<sup>4</sup>.

All of these principles, underpinned by container-based architecture instead of just virtualized, can significantly ease deployment, and telcos’ ability to scale their services according to demand. According to The Linux Foundation’s project Nephio, **the telco industry is realizing that openness drives innovation and agility, which means that a greater evolution and adoption of cloud-native best practices and agile DevOps methodologies are needed**.<sup>2</sup>

Add to this the prioritization of DevOps and efficient software lifecycle management through a CI/CD pipeline infused with automation, and you have the recipe for a winning telco strategy.

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## References:

3 - Cloud Native Computing Foundation. Cloud Native Computing Foundation (“CNCf”) Charter. Cloud Native Computing Foundation, 2021, <https://github.com/cncf/foundation/blob/main/charter.md>. Accessed 22 November 2022.

4 - Cloud Native Computing Foundation. “Autoscaling | Cloud Native Glossary.” Cloud Native Glossary, 23 June 2022, <https://glossary.cncf.io/auto-scaling/>. Accessed 25 November 2022.

# ENHANCING THE CI/CD PROCESS THROUGH AUTOMATION

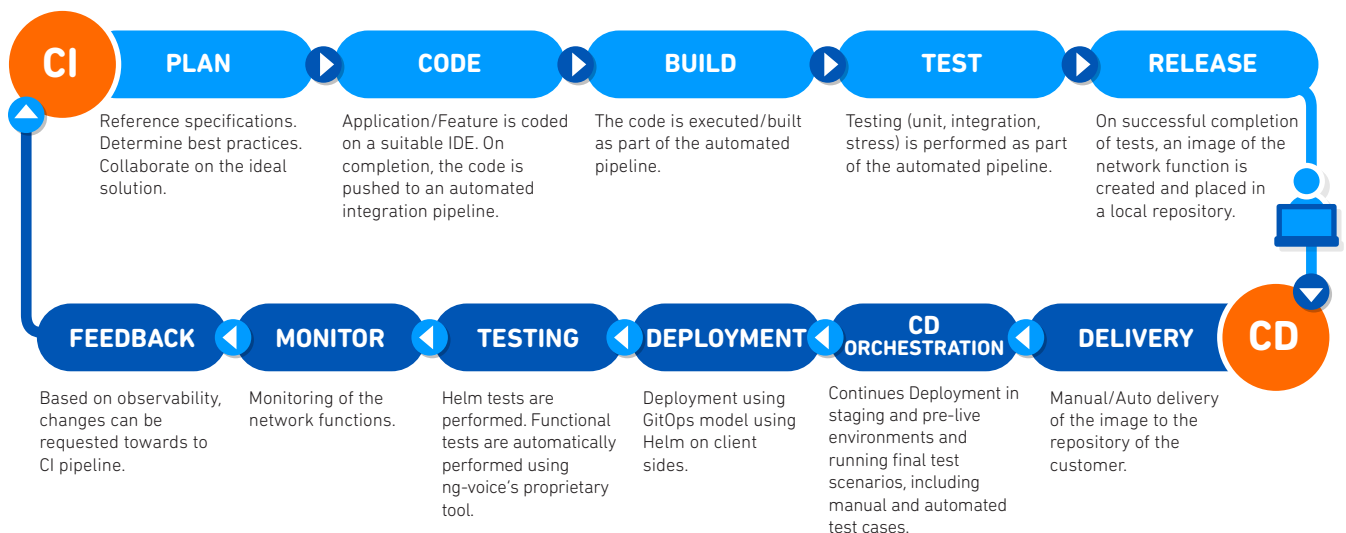


## SO WHAT DOES EMBRACING AUTOMATION ACROSS THE CI/CD PROCESS LOOK LIKE?

Automation across a CI/CD pipeline allows for network functions, such as IMS network functions for Voice over LTE, to be continually updated, reducing any potential negative impact on the overall experience. The use of a microservices-based architecture promotes this, as telcos are able to perform rolling updates or debug a simple component following automated monitoring. This results in great service resilience, using far less human power. Automation also allows for applications to be scaled easily, up or down, to meet changing requirements and user demands.

When embracing CI/CD, it's particularly important to foster automation in the testing stages. This removes the need for repetitive, laborious testing for teams, allowing them to focus on other stages of the pipeline, minimizing errors and increasing efficiency.

The diagram below outlines what ng-voice's CI/CD approach looks like:



## CI/CD AND GITOPS

While there are different ways of embracing CI/CD, at ng-voice, a key element of this is GitOps. Using GitOps throughout the CD orchestration stage ensures that any changes in the repository are automatically deployed in the customer's environment. This approach has three key benefits:

1

**Maximizes flexibility** - GitOps enables fast and more frequent developments, meaning that teams can easily make changes to the software in line with customer and subscriber needs, scaling the application up or down wherever necessary, or incorporating new capabilities.

2

**Encourages productivity** - Teams leveraging automation can focus their efforts on development and enhancements, rather than tedious and repetitive manual tasks. It also allows teams to be more productive and reduce any downtime while facilitating better management of cloud tools, which can also reduce costs.

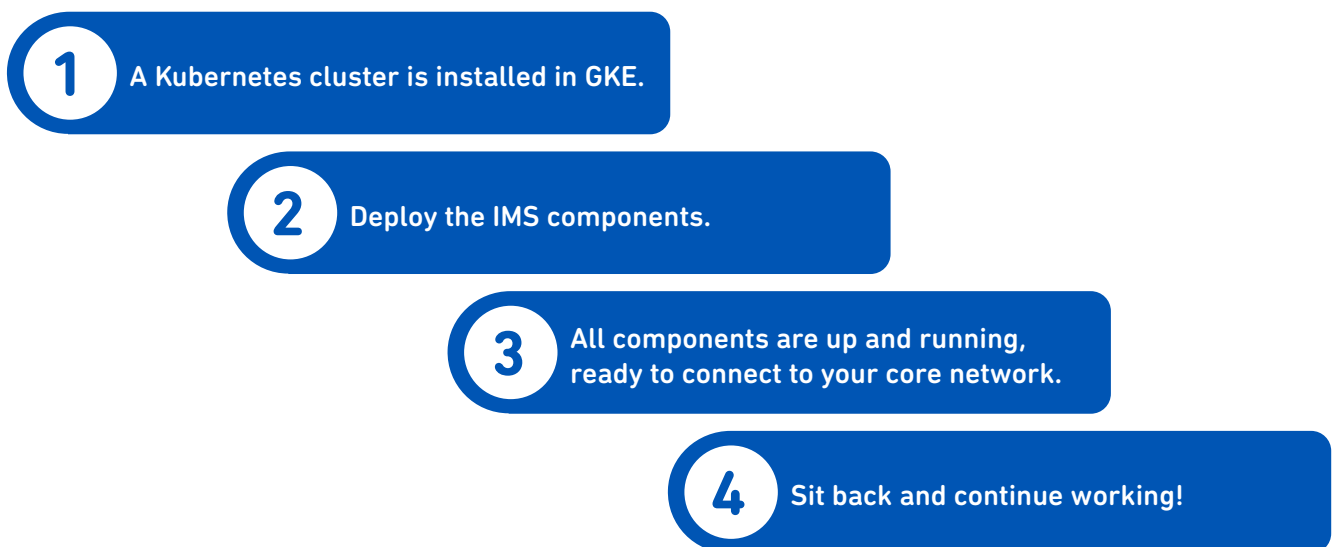
3

**Continuous quality of service** - Infrastructure is codified, making it easily repeatable, which reduces room for potential human error. Merge requests are used to evaluate and review any existing code, which means that any errors can be spotted and corrected prior to deployment. In addition, the automated pipelines used in a GitOps approach continually test for any issues and apply changes, meaning that user experience is never compromised.

# USE CASE: DEPLOYING NG-VOICE'S IMS IN GOOGLE KUBERNETES ENGINE

ng-voice's IMS solution can be deployed in a variety of environments, but one key example which fosters innovation is in the Google Kubernetes Engine (GKE). GKE provides a managed environment for deploying, managing, and scaling containerized applications using Google infrastructure. The environment is comprised of multiple applications grouped to form a cluster, managed by Kubernetes. If one application fails and another needs to begin, Kubernetes will interact with the cluster to manage this process.

Deploying ng-voice's fully containerized cloud-native IMS core in a GKE environment is extremely simple and quick. In fact, its deployment takes less than 10 minutes, to carry out the following steps:



Using ng-voice's IMS core in this way unlocks many of the key benefits of automation, including:

- Faster deployment time, often reducing from months to a matter of hours in total.
- Scalability, allowing services to be adjusted to suit demand.
- Seamless management and monitoring, reducing the need for manual intervention.
- Cost-effectiveness, as the need for human intervention, is reduced and faults are minimized.
- High voice quality as a result of reduced network latency.



# UNLOCKING THE TRUE BENEFITS OF CLOUD-NATIVITY WITH AUTOMATION

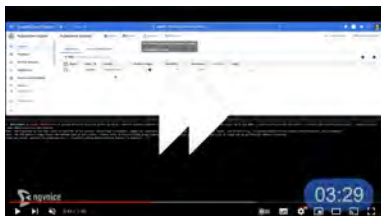
Automation is a key component that will allow the entire telecommunication industry to enhance its services. It improves efficiency and cost-effectiveness, allows for greater scalability, and minimizes the opportunity for error, as well as eradicates the need for human hours to be spent on repetitive tasks.

ng-voice's fully containerized cloud-native IMS solution embraces automation at all stages and fosters a CI/CD approach. This provides clients and partners the required scalability and flexibility they need to meet changing user demands, as well as minimizing downtime through continually monitoring for faults and bugs and automatically rolling out solutions. Working with a variety of customers, including MNOs, MVNOs, private networks, and IoT providers, providing highly automated, cloud-native software and IMS.

To learn more about ng-voice's fully automated, cloud-native solution and how it could be right for your business, contact the team at [sales@ng-voice.com](mailto:sales@ng-voice.com) or learn more [here](#).

To learn more about Google Cloud Platform [visit their website](#).

## MORE ABOUT TRUE AUTOMATION



Watch more on how ng-voice's fully containerized and cloud-native IMS is deployed in the Google Kubernetes Engine in less than 10 minutes.

[Watch the video](#)



Voice of the industry  
On the road to public cloud 5G networks  
By Nephio May 13, 2022

Read "On the road to public cloud 5G Networks" article in the The Linux Foundation's project Nephio blog.

[Read the blog](#)



**ng-voice's fully containerized cloud-native IMS recognized as the Best VoLTE Solution** within the 6th annual Carrier Community – Global Awards (CCGA), which recognizes innovations and achievements among telecom wholesale operators and ecosystem partners around the globe.

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