Nokia CI/CD services for the modern agile core

Transform your core network for limitless flexibility with Nokia continuous integration and continuous delivery services

NOKIA

Embracing software-driven networks

The evolution to 5G and a cloud-native core gives you operational flexibility and the ability to rapidly innovate and respond to market demand. It has also created a dynamic deployment environment with its own special challenges. To realize the benefits of DevOps-style, iterative software development in the telecommunications environment, Nokia has developed a specialized approach to achieve continuous integration and continuous delivery (CI/CD) that we call Delivery Operations or DelOps.

The high degree of complexity in connectivity services, with their multi-vendor and multi-domain supply chains for software, and multiple production environments, requires an additional level of process focused on delivery operations. DelOps sits between DevOps-style software development and the delivery of new features and upgrades into your highly complex environment. Employing high levels of automation and integration, our DelOps approach enables you to harness the benefits of cloud-native, virtual networks and manage the complexity of your hybrid operations.

Beyond technology, DelOps also addresses organization challenges, especially around the transformation of people and processes.
Our DelOps CI/CD services are part of an overall solution that helps you to break down traditional silos for faster time to market, reduced roll out cycle times, improved efficiency and reduced risk.
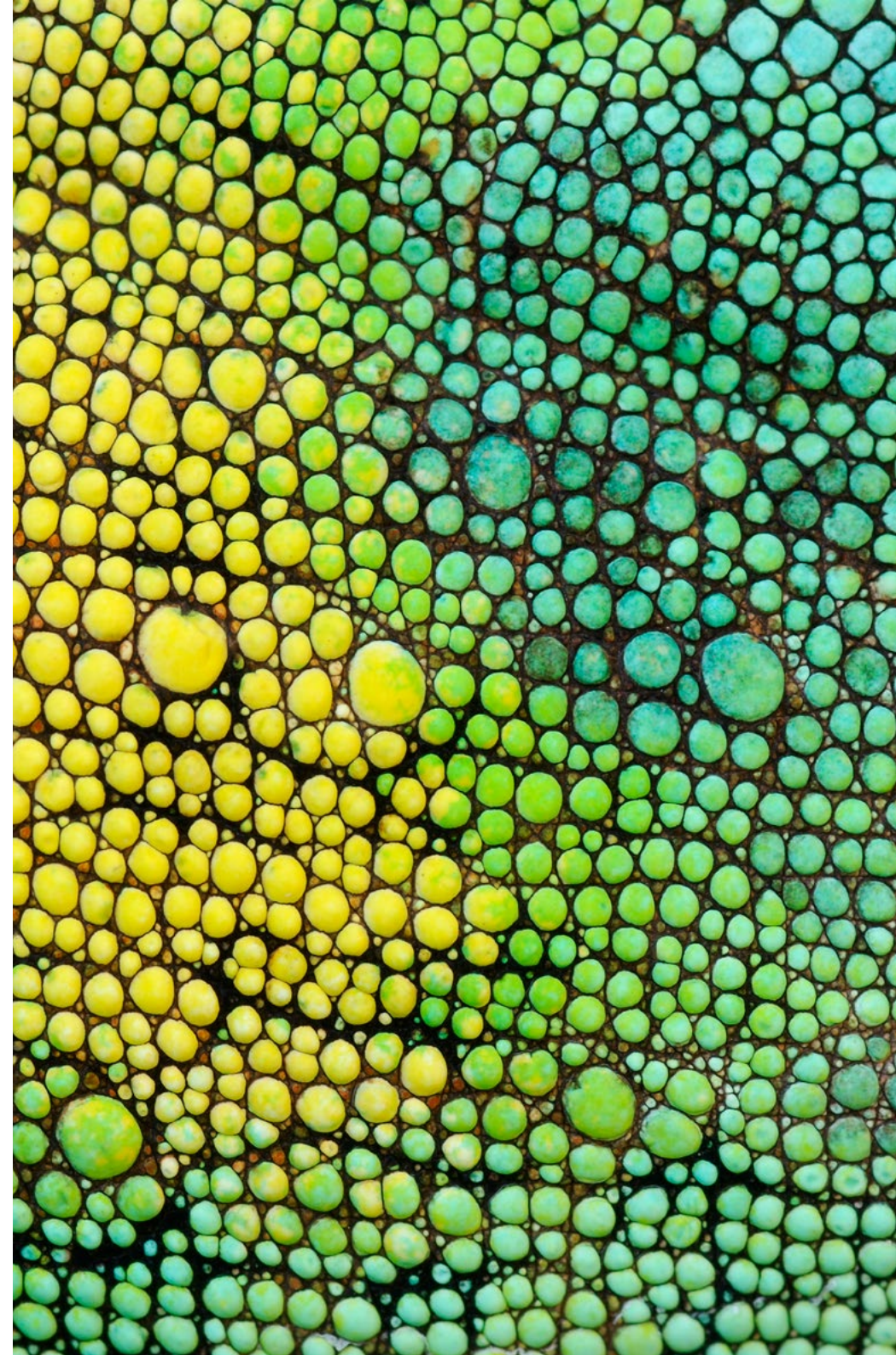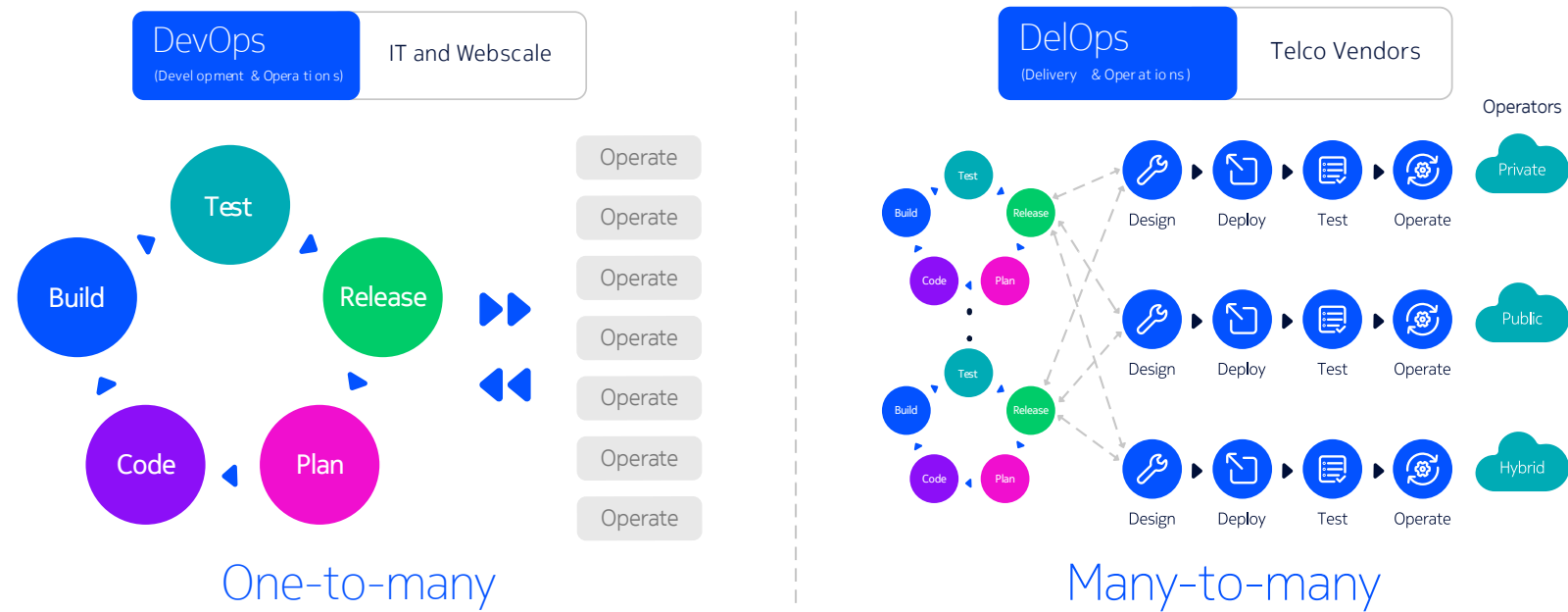
DevOps and DelOps

First originating in IT and webscale companies to assure continuous development and operations, DevOps is now used widely in telecom networks as well. However, implementing DevOps in the telecom environment is not straightforward. There is a great deal of more complexity than in IT and webscale networks — multiple domain environments, third-party software and hybrid cloud environments. In contrast to the one-to-many DevOps process more typical of an IT environment, achieving continuous integration and continuous delivery in the telecom environment requires a many-to-many delivery and operations process we refer to as DelOps.

In the telecom environment, there is the need for strict network reliability to achieve the KPI commitments you make to your customers. This is not a natural match for the highly changeable and adaptable nature of DevOps. Another challenge is that you have heterogeneous networks, in contrast to the more homogenous, wholly owned setups of IT and webscale companies, which are designed specifically for their SaaS offerings. Lastly and most importantly, DevOps in the telecom industry must deliver software to diverse, unique environments as compared to a single-owned service of web-scale companies.

DelOps uses a different integration process for each environment or platform, with design, deploy, test and operate phases. Like DevOps, DelOps uses agile processes to reduce time to market for new products and features and avoids waterfall releases and updates. It is also more flexible and scalable and adapts to the heterogenous and evolving nature of most operator environments.

With DelOps, you also enjoy early access to updates, new technology and features. DelOps continuous integration and delivery ensures better product quality, more reliable releases and overall productivity and efficiency improvements.

Figure 1. DevOps and DelOps

DevOps (Development & Operations) — IT and Webscale

One-to-many

DelOps (Delivery & Operations) — Telco Vendors

Many-to-many

DevOps and DelOps

Nokia offers a suite of pre-integrated and pre-tested CI/CD solutions for the delivery and deployment of products and solutions for operator-specific environments. We also offer solutions for integrating with third-party ecosystems.

We partner with your delivery, operations and testing teams to understand your goals, network environment and devel-opment trajectories. We engage jointly with your delivery and operations teams to develop agile integration and delivery processes and automate testing and deployment.

The DelOps lifecycle is composed of:

Software artifacts delivery

Automation of software release and delivery. This is a many-to-many process, as we automate the secure software release and delivery to the various hybrid systems in your on-premises production environ-ment, including application software images, artifacts, service design and build artifacts, and test harness along with the right entitlements.

Network, services plan and design

Automation of application configuration, plan and design on your specific infrastructure and ecosystems.
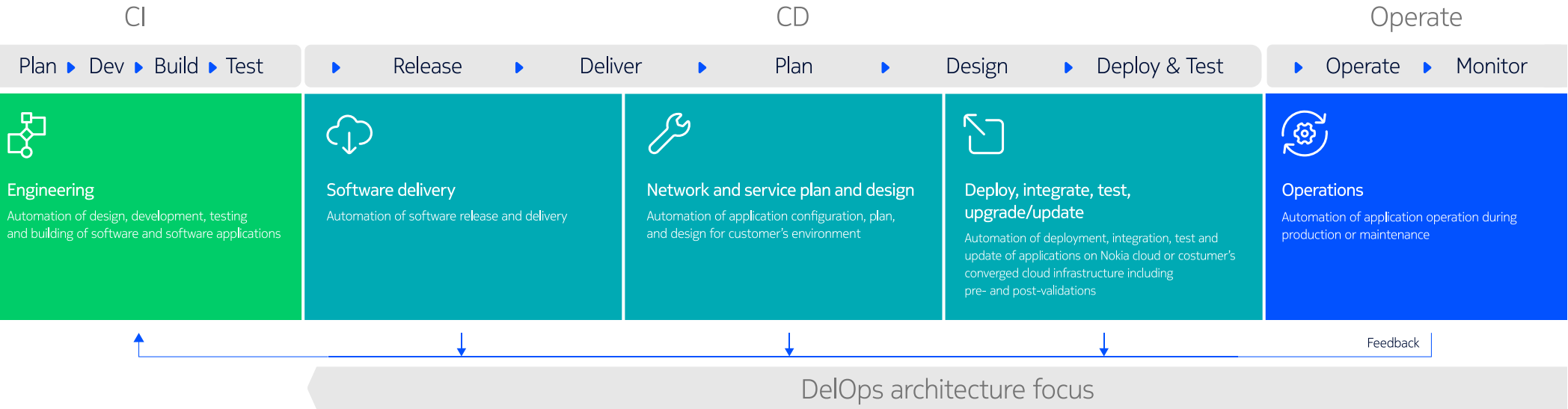
Deploy, integrate, test, upgrade/update

Automation of deployment, integration, test and update of applications on the Nokia cloud or your converged cloud infrastructure including pre- and post-validations.

Operations

The operations stage automates applications, upgrades and feature enhancements during production and maintenance. The resilience of the DelOps approach is based on the constant feedback and continuous integration and delivery processes, as well as ensuring fast failback at any point to previous states for highly reliable operations.

Figure 1. DevOps and DelOps

CI — CD — Operate

| Plan ▸ Dev ▸ Build ▸ Test | ▸ Release ▸ Deliver | ▸ Plan ▸ Design ▸ Deploy & Test | ▸ Operate ▸ Monitor |

Engineering
Automation of design, development, testing and building of software and software applications

Software delivery
Automation of software release and delivery

Network and service plan and design
Automation of application configuration, plan, and design for customer's environment

Deploy, integrate, test, upgrade/update
Automation of deployment, integration, test and update of applications on Nokia cloud or costumer's converged cloud infrastructure including pre- and post-validations

Operations
Automation of application operation during production or maintenance

Feedback

DelOps architecture focus

DelOps CI/CD services model

We have tailored our DelOps services approach to three broad segments of the CI/CD services market. Whichever best fits your situation, your CI/CD processes will undoubtedly also have their own unique features to which we will customize our CI/CD framework, partnering closely with your delivery and operations teams in the process.
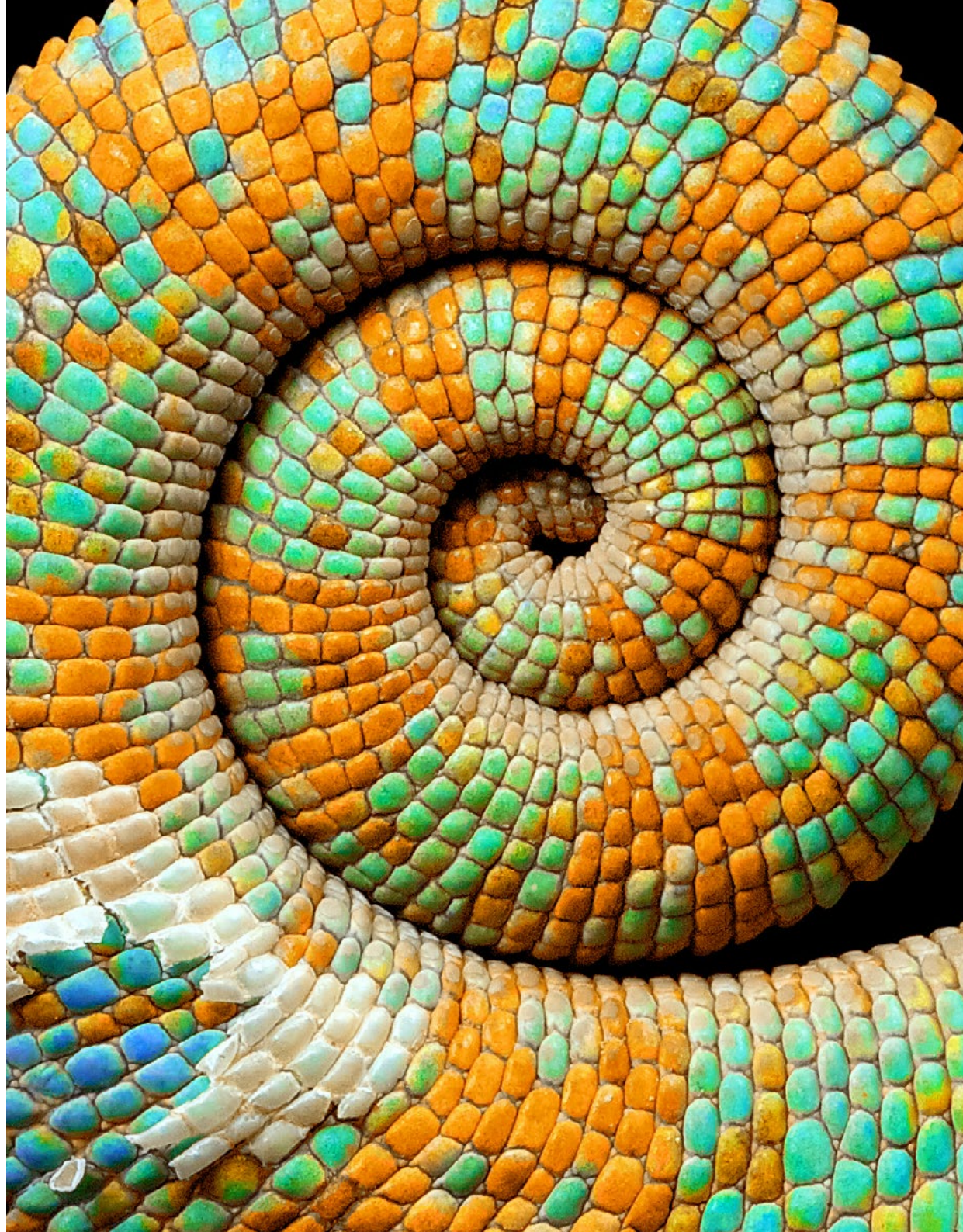
Nokia CI/CD framework

For those customers that have adopted the Nokia CI/CD framework for their network, we leverage that framework to integrate our core network functions into your environment.

Operator developed CI/CD frameworks

Some of our largest customers have an entire, or portions of a, CI/CD framework, in which case we adapt our own CI/CD framework seamlessly with your appropriate integration points, in a modular fashion.

Third-party CI/CD frameworks

There exist a few CI/CD frameworks that are provided by third-party system integrators in the industry. In these cases, we harmonize our CI/CD service with your third-party system.

DelOps CI/CD services

Standard CI/CD Services

Pre-launch services

- Planning, designing and deployment services for Nokia CI/CD framework
- Automated testing covering unit level testing and solution level testing (Test Automation Framework)
- Deployment of NF product/solution (implementation, integration)
- DelOps CI/CD mass provisioning

Post-launch services

- Care for CI/CD framework
- Change and release management (SUS) and NF software maintenance

Enhanced CI/CD Services

Pre-launch services

- DelOps CI/CD readiness and assessment services (consultancy)
- Design customer-specific "design artifacts" creation for network function solution
- Customer-specific workflow adaptation for CI/CD
- Customer-specific test adaptation for CI/CD (additional test cases)

Post-launch services

- Design and create customer-specific artifacts for software maintenance (upgradation)
- Care services of customization workflows

Specialized CI/CD Services

Pre-launch services

- Integration with foreign CI/CD pipeline
- Third-party repository integration with Nokia CI/CD pipeline
- Third-party NF integration to Nokia CI/CD pipeline
- Third-party test-harness integration to Nokia CI/CD pipeline
- Third-party cloud, e.g., Kubernetes, Virtual Machine Introspection (VMI), NFV orchestration (NFVO), security operations and ticketing system integration with the Nokia pipeline.

Post-launch services

- Care services of customization and integration

DevOps and DelOps

Our DelOps CI/CD services will help you to improve your **roll-out cycle times** for network function upgrades and updates from months to weeks. It will enable you to deploy features and patches more frequently. The flexibility and agility of our services will translate into increased revenue through on time and faster delivery of services and features to your subscribers.

Nokia DelOps will also **improve your efficiency** by reducing the effort of creating, executing and maintaining test cases. It will also reduce the effort of tracking and managing releases and features.
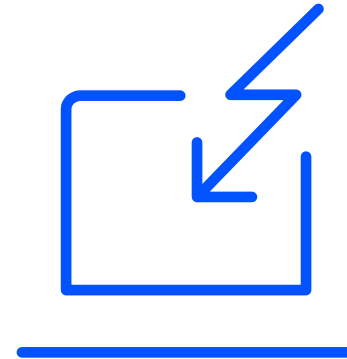
Finally, DelOps will **reduce the risk** of upgrades and updates in your production network thanks to the holistic automation offered by DelOps continuous integration and continuous delivery.
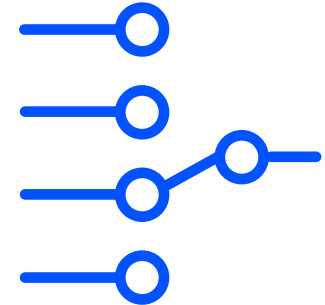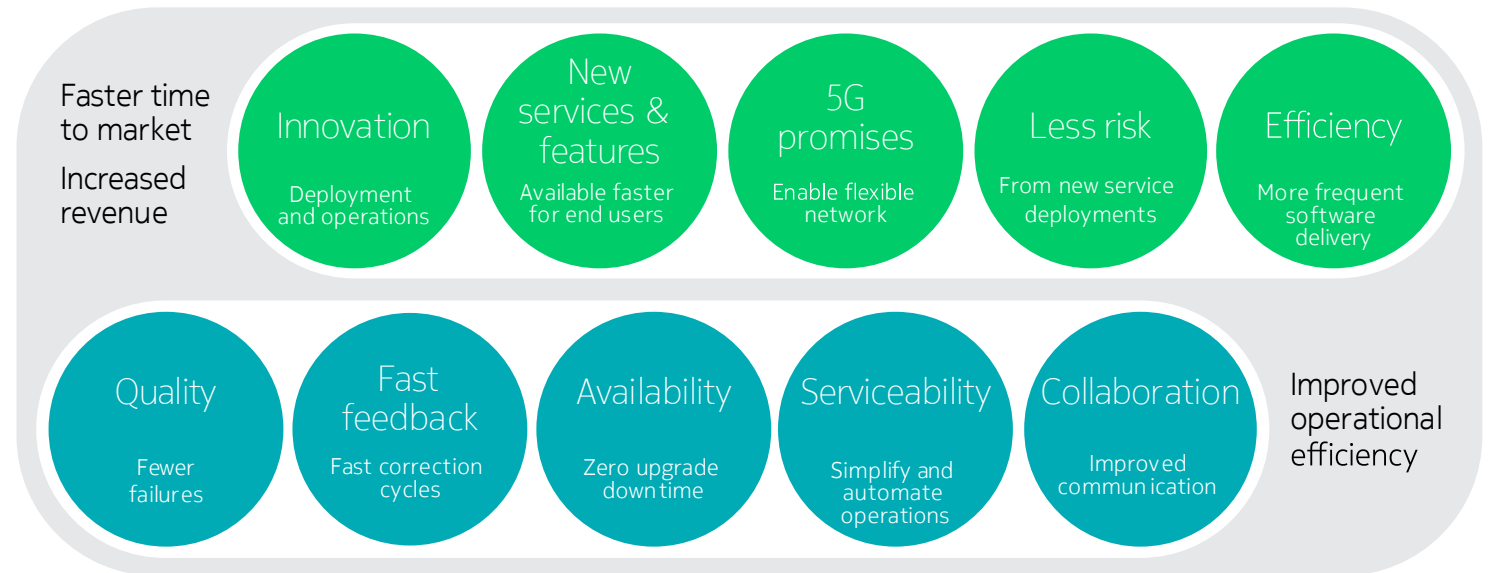
Developing your own CI/CD pipeline in-house by using **open-source components** poses the risk of overshooting timelines and budgets due to the **complexity** of interworking and integrations at multiple layers of automations. The Nokia DelOps CI/CD framework reduces this risk for you.

Why DelOps

We encourage all of our customers to look beyond the technology. To really harness the power of 5G will require you to invest in people and processes. This includes automating many of the more mechanical processes, opening lines of communication and creating a collaborative and creative environment for vendors and internal teams where openness will be critical for success.

Learn more about DelOps here »

Faster time to market

Increased revenue

Innovation
Deployment and operations

New services & features
Available faster for end users

5G promises
Enable flexible network

Less risk
From new service deployments

Efficiency
More frequent software delivery

Quality
Fewer failures

Fast feedback
Fast correction cycles

Availability
Zero upgrade down time

Serviceability
Simplify and automate operations

Collaboration
Improved communication

Improved operational efficiency

10 reasons to go for DelOps

Why Nokia

Our CI/CD services are well-defined and leverage proven solutions. We have a proven track record in managing complexity and our world-leading skills and expertise are directly available to our customers. Nokia is engaged with all of the top communications service providers globally for their De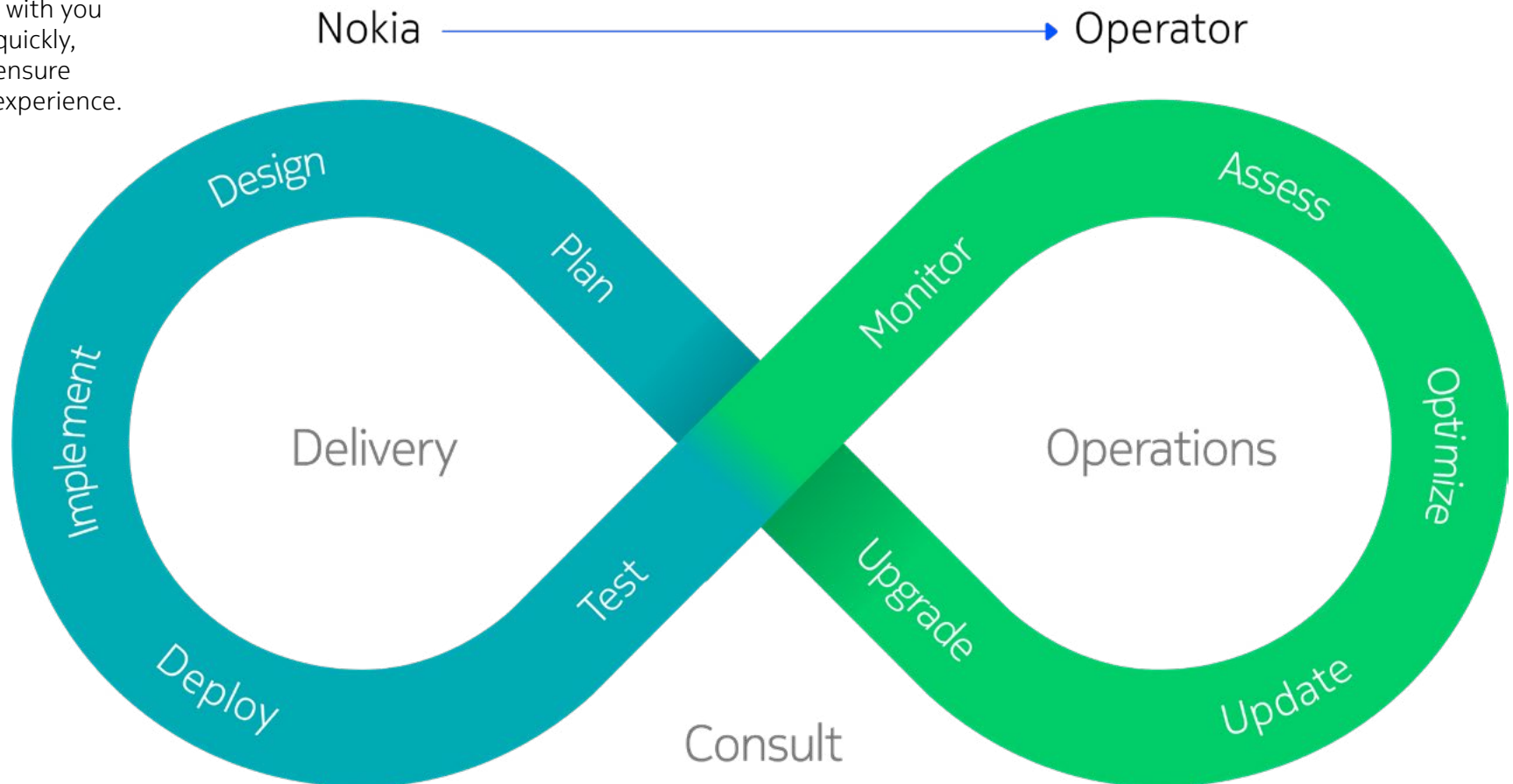lOps CI/CD requirements. Our most recent engagements and consultations typically address how operators can adopt and deploy DelOps for their evolving 5G agile core networks. These engagements are multifaceted in scope and coverage, and they range from customer workshops, to RFP/RFI submissions and architecture discussions.

We would be happy to engage with your teams around the topic of making continuous integration and delivery part of your ongoing processes.

The Nokia suite of design, consult, deploy and operations services

DelOps CI/CD services are part of our full suite of software and cloud services. They are designed to help you evolve your network to the highest levels of performance and feature competitiveness. We partner with you to help deliver new services quickly, generate new revenues and ensure the best possible customer experience.

Nokia → Operator

Design
Plan
Implement
Delivery
Test
Deploy

Consult

Monitor
Assess
Operations
Optimize
Upgrade
Update

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.