Ready for DevOps?
Culture for delivering value faster
DevOps: Your questions answered

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Innovation has always been the lifeblood of business success. In today's world of rapid digital transformation, innovation needs to be done at speed. And, particularly with the rise of future networks, that calls for novel and powerful software that can address business challenges the moment they arise.

The traditional way to enhance software is to produce major upgrades that are released a few times a year. Soon, this will be too slow and will risk the solution becoming outdated and left behind by changing events.

A shift is therefore needed, away from the old, slow delivery models that have characterized the telco industry, towards fast paced, frequent deliveries. Yet this raises the challenge of meeting the needs of the telecoms industry, such as extreme reliability and huge scalability, while maintaining stability in the running systems.

So, Nokia proposes to embrace the DevOps method, where both people responsible for the development of the software and for its operations, work together in a process of continuous improvement. The result will be a faster development cycle and a software package more attuned with changing needs.

Why introduce DevOps to telecoms?

DevOps employs several key practices to glue together operations and software development:

- Renewing SW architecture to be cloud-native and modularized
- Continuous testing, delivery and deployment
- Workflow automation (e.g. lifecycle management)
- Continuous and automated monitoring and collection of feedback
What are the benefits of DevOps?

DevOps brings several business and technology benefits to the telecom industry.

**Business agility**

Because innovation is accelerated, operators can provide new functionality faster for end users.

It also means the operator can react to market changes more quickly, by getting early feedback. If the service is not well accepted, it can be quickly amended.

With DevOps, applications and code can be updated on demand, every few months or weeks, instead of once a year. The product is kept live and responsive to changing needs. In many instances, it becomes possible to implement a service update much faster than in earlier conventional processes.

**A culture for quality**

DevOps, at its heart, is a cultural change. That’s because it creates a continuous improvement mindset that increases collaboration and sharpens everyone’s focus on value and quality. DevOps naturally increases trust, improves knowledge sharing, empowers teams and stakeholders, and generates ingenuity.

Teamwork is also fostered, with everyone in the value chain knowing and playing their part in improving the product.
How does Nokia implement DevOps?

Nokia has a vision of how we will use DevOps principles to continuously explore and respond to customer needs. We will:

- Adopt the principle of release on-demand - supported by cloud-native principles like microservice-based software architecture and continuous deployment
- Change feature roadmaps according to priorities – e.g. at first features with a fixed delivery date, then the ones scheduled but not yet started, finally low priority features that can be scheduled
- Simplify and automate operations – for example by using a flexible software architecture and a modern SW repository
- Work with our customers as partners to ensure the right product is developed
- Support multi-vendor setup

The business benefits of faster software delivery

For many operators, Nokia’s use of DevOps to run a faster software delivery process brings substantial benefits, enabling them to:

- Offer new products and services to their customers more quickly
- Reduce the cost and risk of new service deployments
- Accelerate business development and innovation
- Handle demand and shift in the consumer market
- Minimize the risk of incompatibility in multivendor setup
- Improve their ability to move into new markets
What does Nokia mean by a renewed architecture?

The essence of the DevOps approach is to avoid the traditional monolithic way of developing software and to adopt a new, more self-contained architecture that lends itself to rapid renewal and development.

One of the major techniques is to create the product in smaller software components like microservices. In this method, developers break down the functionality into separate services, and these services are distributed across servers in different locations.

Another concept is that of containers. Containers isolate software from its surroundings and help reduce conflicts between teams running different software on the same infrastructure. Keeping containers lightweight decreases the time spent on deployment and scaling.

Containers help operators to be host agnostic, offering the possibility to deploy the software in several different types of infrastructure, according to business and cost requirements.

**Microservices**

“...an approach to developing a single application as a suite of small services, each running in its own process and communicating with lightweight mechanisms, often an HTTP resource API. These services are built around business capabilities and independently deployable by fully automated deployment machinery.”

https://martinfowler.com/articles/microservices.html

**Containers**

“A container image is a lightweight, stand-alone, executable package of a piece of software that includes everything needed to run it: code, runtime, system tools, system libraries, settings. Available for both Linux and Windows based apps, containerized software will always run the same, regardless of the environment.”

https://www.docker.com/what-container
How do you achieve continuous deployment?

One of the pillars of DevOps is continuous deployment, a principle that contributes to much more effective operations.

Unlike other professions such as sports teams or military units, operations teams only “practice” their task during actual deployments. Under traditional practices, this might occur only rarely, with a release that could contain hundreds of changes. By contrast, a team working on the DevOps principle might deploy new versions of a product frequently over a short time, each version containing only a small number of changes. It is partly this familiarity that contributes to the improved efficiency.

Since continuous deployment is automated, it is also less error-prone. Also, improving the test set from deployment to deployment increases the quality of the solution.

Other practices that make continuous deployment so effective are:

• updating a series of software components rather than one large application
• continuous integration into live network services
• frequent delivery and delivery on-demand
How does DevOps simplify and automate operations?

Part of the philosophy of DevOps is to make development and operational use of software simpler and easier to achieve. A key point here is removing the potential for human error by standardizing and automating processes so they become repeatable and reliable.

To do this, high levels of automation and orchestration are vital. In the long term, automation will ideally include all the key processes:

• Delivery and deployment
• Rollback
• Shared testing
• Lifecycle of applications and complete network services
• Failure detection and prevention

Other vital aspects include:

• A modern software repository
• Maintaining a live development and test environment that emulates production to get fast and frequent feedback
• Open source tools shared with customers and/or other vendors
• Open application programming interfaces (APIs)
Why do the vendor and operator need to work as one?

DevOps is a lot about collaboration. A major part of the DevOps mindset is getting the vendor of the software and the operator of the software thinking and working as one. To do this, they must be closely linked and exchange information as if they were all part of the same organization - by for example integrated tool chains, more openness and transparency and automated feedback loops.

The close cooperation between operations and development leads to operations becoming aware of changes as they are being developed, helping them plan their activities much earlier. They can also offer suggestions that will aid the implementation of those changes when the time comes to deploy them.

Similarly, linking development staff with operations gives them a better awareness of the complexity of the entire delivery system, as well as how their changes will affect deployment.

Equally important are setting up processes for continuous and automated monitoring and feedback.
What’s the big picture on DevOps?

DevOps is a critical enabler for digital transformation and plays a major role as operators seek to place their network operations in the Cloud, ready for the demands of future networks. It will help them significantly reduce the time required to offer new services compared to the traditional model.

Holding the prospect of better productivity, efficiency and agility, DevOps also helps meet the specific demands of various use cases that will be a fundamental part of future networks - Internet of Things (IoT), vehicle communications (V2X), robotics and the tactile Internet.

To gain the full benefits from the DevOps methodology, Nokia applies DevOps practices end-to-end, improving all stages of software lifecycle management - processes, planning, design, development, monitoring and operations.

As networks are moved increasingly to the Cloud and become more software based, DevOps is a way of easing the transition and ensuring that operators can continue to develop their network operations smoothly and efficiently in the future.
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