CI/CD: IT meets networks

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The challenge of change

Change is happening at ever-increasing speed, from nearly every angle, and in a never-ending cycle. Technological innovation sparks social and lifestyle shifts, which affect the way we do business, which then drives the next generation of technological development. Enterprises must be agile and lean enough to respond rapidly to changes such as elevated customer demands, market conditions, competitive pressures, regulatory requirements and other influences.

Service providers can no longer wait on the sidelines. 5G is here, an inflection point for disruption and opportunity. As 5G opens multiple new revenue streams, it's triggering an increase in the number of required software deployments and driving increased needs for speed and efficiency across multiple vendors. In response, the industry is transitioning from monolithic applications to cloud-native applications based on microservices, with hundreds of applications changing rapidly. As they are continuously updating their offerings with new products and services, complexity grows. Teams implementing 5G can quickly become overwhelmed.

IT, meet the Network

Only by adopting automation can service providers effectively reap the benefits of 5G—or just meet the urgent challenges to their current network. This goes beyond orchestration. The key to deploying new and updated software and products on-demand is a new way of working: continuous integration/continuous delivery or CI/CD.

Traditionally, the IT team develops and deploys their own new IT applications at a fast pace, while the Communication Network team deploys more standardized features. They currently seem to live in nearly separate realms. For example, the requirements of reliability for network applications are more stringent than those applicable to IT ones. CI/CD enables IT and the Network teams to collaborate in unprecedented ways and leverage one another's expertise in a process of continuous improvement.

CI/CD has the power to transform the development process for network providers. Testing is automated throughout the cycle. The testing data, plus regular feedback from network providers, results in software that is better focused on network providers' needs and developed and released more quickly.

CI/CD, more than just a technology

CI/CD is also an exercise in change management, involving people and processes as well as the technology and tools to enable end-to-end continuous delivery of software code or deployment of packaged products. The impact on the entire enterprise is enormous, requiring Network expertise as well as a clear understanding of how to leverage IT-inspired technology (cloud-native, CI/CD, AI/ML, edge compute, and Open Source) to drive agility and automation, ultimately improving operational efficiencies and profitability.

Read more about the culture and mindset changes required within the 3Ps: policy, process and people here.
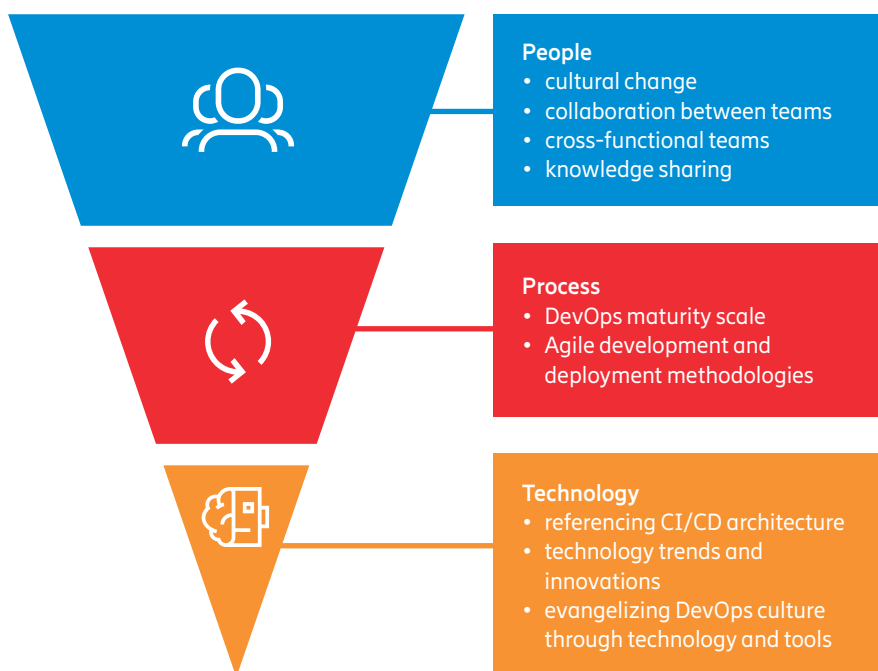
CI/CD stands for continuous integration/continuous delivery and/or continuous deployment

- Continuous integration: The ability to frequently merge changes back to main branch (aka "integration"), change validation through build creation and run automated tests. This minimizes integration work during software release by merging changes into the release branch in advance.

- Continuous delivery: An extension of continuous integration, ensuring quick and sustainable release of software changes. Automated testing on top of automated release process and simple software deployment. Enables flexible release plans and easy troubleshooting through early deployment of smaller release batches to production.

- Continuous deployment: This goes one step beyond continuous delivery. Changes passing all pipeline stages are released to customer. No human intervention. Only failed tests prevent new change from being deployed.

People
- cultural change
- collaboration between teams
- cross-functional teams
- knowledge sharing

Process
- DevOps maturity scale
- Agile development and deployment methodologies

Technology
- referencing CI/CD architecture
- technology trends and innovations
- evangelizing DevOps culture through technology and tools

People adopting the culture of CI/CD are supported by processes and tools

CI/CD drives significant efficiencies within:

- **Environment creation:**
  Save weeks or months for production or test environments by creating environments that are on-demand, completely self-serviced and always available when needed.

- **Code deployment:**
  Save weeks and months on production code deployments by automating deployments as much as possible, with the goal of being completely automated so they can be done self-serve by any developer.

- **Test setup and run:**
  Automate tests to execute deployment safely and parallelize them so the test rate can keep up with the code development rate, replacing weeks of test environment setup and manual regression tests.

Benefits to service providers
The continuous cycle across development and operational teams brings significant advantages as service providers race to adapt to the coming avalanche of change.

Reduced risk and better quality
Thanks to the high level of automation in the broader CI/CD processes, updates can be gradual rather than major large projects, and tested automatically as they are made. Issues can be detected as early as possible in the chain of events and sent back as many steps as required to be fixed. In fact, industry analysts say, an early captured issue is 10 to 100 times cheaper to fix than one caught out in production. Also, the introduction of automation with removal of manual configuration and reduction of time to fix errors yields opex improvements ranging from 30 to 50 percent.

Security and regulatory compliance are fully transparent. CI/CD lets service providers automatically execute required verifications that can be easily logged, shared and even propagated as required. Security vulnerability is reduced when the latest software version is always in place and distributed to customers.

This results in increased quality of the deliverables. Customers are guaranteed the latest and most reliable software release. And service providers experience fewer issues and rework down the chain, along with a reduction of service-level agreements (SLA) penalties.

Improved market position
When they can deliver a new feature as soon as it's ready—instead of six months from now—service providers are able to deliver the value to the customer quicker,

consistent with lean and agile practices. Shorter lead times also contribute to increased customer confidence. A new feature in development can be aligned with customer expectations continuously. This improved agility helps the company steer more quickly and more confidently towards new goals and objectives. This also helps service providers lower the risk of experimentation in the development of new end-to-end services for their customers.

Increased efficiency
CI/CD enables significantly faster access to both software improvements and new features facilitated through a shorter release schedule and through automated delivery and deployment of new software versions. They can also provide feedback more quickly and impact feature development earlier.

This entire process is streamlined and smoothed when IT and Network teams and concepts work together. Tasks are uniform across the network, repetitive tasks are automated and the necessity for heroic measures and maintenance is significantly reduced. Service providers find that they can do more with the technology and resources they already have. The efficiency enabled by automation provides the service provider with the means to manage network and device complexity at a much larger scale.

Ericsson at the forefront

The drive to automation through CI/CD will underpin the survival of service providers as they confront the massive changes that are arriving every day. As we said, CI/CD is a technological evolution that involves new architecture and tools.

But it's more than just technology. It's a massive sea-change in culture; in the way teams interact; and in processes, with agile development and new deployment methodologies. Service providers recognize that they can't navigate this sea-change alone. They need a trusted partner with the global reach and local expertise to help them navigate this new terrain.

There is a strong need for a highly automated, multivendor, continuous deployment platform that can manage the onboarding, validation and certification of Network Services comprising virtual network functions (VNF), cloud network functions (CNF), physical network functions (PNF) and the network functions virtualization infrastructure (NFVI.)

The Ericsson Cloud Deployment Engine (ECDE) provides a multivendor ingress platform, as well as pipeline orchestration to automate the various lifecycle stages. Installed on premises and operated by service providers, ECDE enables CI/CD and automation across their software.

Similarly, Ericsson's Software Subscription and Product Support 2.0 (SSPS 2.0) offering enables an agile, one-track approach to software delivery with a subscription service that greatly reduces time-to-market for enabling new software functionalities.

At Ericsson, we're leveraging our Network and IT expertise to automate 100 percent of our 5G offering. We've come a long way in automating our 4G solutions—we've learned from it, and we're showing our customers how to do it through a holistic approach of people, processes, and technology. So far, we've enabled CI/CD for 45 products, powering more than 315 customer engagements worldwide, the best practices of which continue to contribute to the open source community with insights and live network deployment experiences. Examples include this cross-organizational end-to-end 5G CI/CD pipeline we built with KDDI and this implementation of CI/CD with China Mobile. We have also made numerous contributions to the CI/CD domain by forming and leading initiatives and collaborating across the industry to address the need for interoperability.

We have the "Network Know-How" and expertise in cloud-native, CI/CD, AI/ML, edge compute, and open source. We are bridging network and IT to help our customers transform their businesses in order to take full advantage of the opportunities 5G offers.
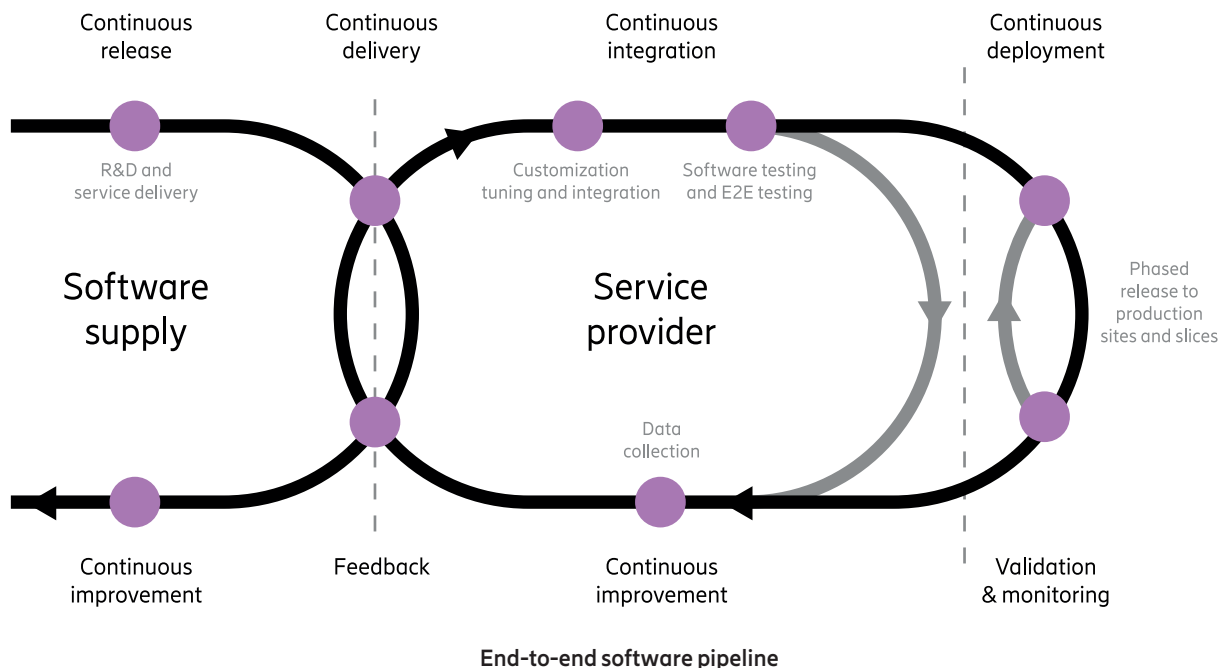
100%
of Ericsson's 5G offering can be automated

150+
CI/CD engagements worldwide

45+
products enabled by CI/CD

Continuous release Continuous delivery Continuous integration Continuous deployment

R&D and service delivery

Customization tuning and integration   Software testing and E2E testing

Phased release to production sites and slices

Software supply   Service provider

Data collection

Continuous improvement   Feedback   Continuous improvement   Validation & monitoring

End-to-end software pipeline

About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.
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