White paper

Transforming DevOps engineers' lifetime value with a cloud-native development platform

July 2020

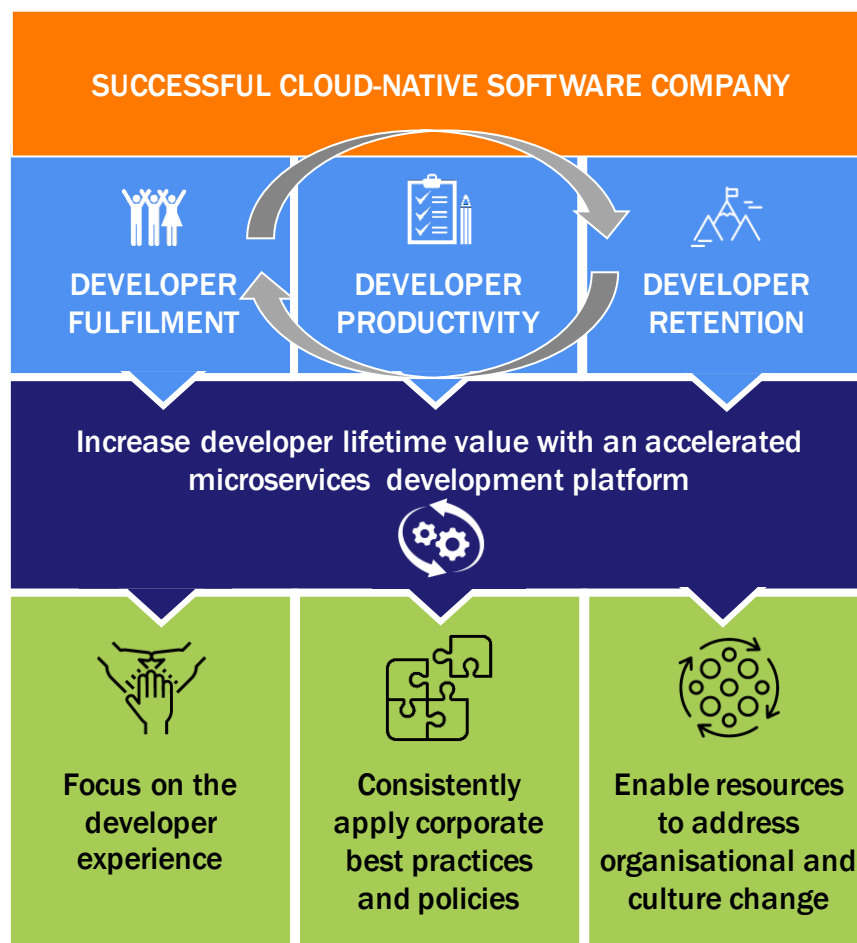Caroline Chapell

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1. Executive summary

Companies need to transform themselves into software companies and must be able to leverage cloud-native software development and delivery best practices if they are to add value to their products and services, outcompete their rivals and satisfy their customers in today's digital world.

In order to make this transition, enterprises need to maximise the lifetime value of their developers by lowering acquisition costs and increasing productivity and retention rates. This will be particularly challenging in a market where the right skills are scarce and expensive, and the most-qualified developers are often sought-after creatives with low boredom thresholds and a strong sense of their own value. Providing developers with a congenial working environment where they feel productive and fulfilled is a paramount concern for companies, but at the same time, businesses need to enforce corporate policies and best practices without appearing to constrain developer autonomy.

To resolve this conundrum, companies need to provide their valuable developers with a new type of cloud-native platform, which can accelerate microservices development at a corporate scale. The starting point for such a platform should be the quality of the developer experience that it delivers, underpinned by three cultural values: empowerment, psychological safety and professional recognition. The platform should also reinforce corporate best practices and policies by providing ready-made automation and integrations that are compelling for developers to use. This will ensure that all code is consistent in the way that it addresses non-functional requirements and that every microservice can 'play' safely with others because they will all comply with the same policies. Finally, an accelerated microservices development platform should enable developers to be immediately productive by providing a flexible selection of pre-integrated and open-source, cloud-native tools and best practice guidelines so that enterprises do not have to spend time on comparison and integration activities; instead, enterprises can focus on the harder task of changing organizational culture and mindsets.

Figure 1.1: Corporate objectives and platform solution for cloud-native software development

SUCCESSFUL CLOUD-NATIVE SOFTWARE COMPANY

DEVELOPER FULFILMENT

DEVELOPER PRODUCTIVITY

DEVELOPER RETENTION

Increase developer lifetime value with an accelerated microservices development platform

Focus on the developer experience

Consistently apply corporate best practices and policies

Enable resources to address organisational and culture change

Source: Analysys Mason, 2020

This paper discusses the concept of an accelerated microservices development platform, explains why such a platform is critical to a company's cloud-native software delivery, and identifies the features that enterprises should look for when selecting a platform. Platforms should include the following features:

- a facility that centrally curates the practices and tools that are used in the platform to ensure development consistency across the enterprise
- support for the community-based evolution of these practices
- tools that allow developers to feel that they have a stake in the platform and that their tool choices are respected
- templated automation of the tasks that are necessary but boring for developers to complete in order to reduce their burden
- compliance with corporate policies and automated support for quality engineering, for which responsibility has shifted from the testing function to the developers themselves.

This paper describes an example of an accelerated microservices development platform, Amdocs MS360, which has been developed and refined over several years during its deployment on a number of partner platforms (such as Red Hat OpenShift).

2. The ability to develop software is a strategic resource in a cloud-native world
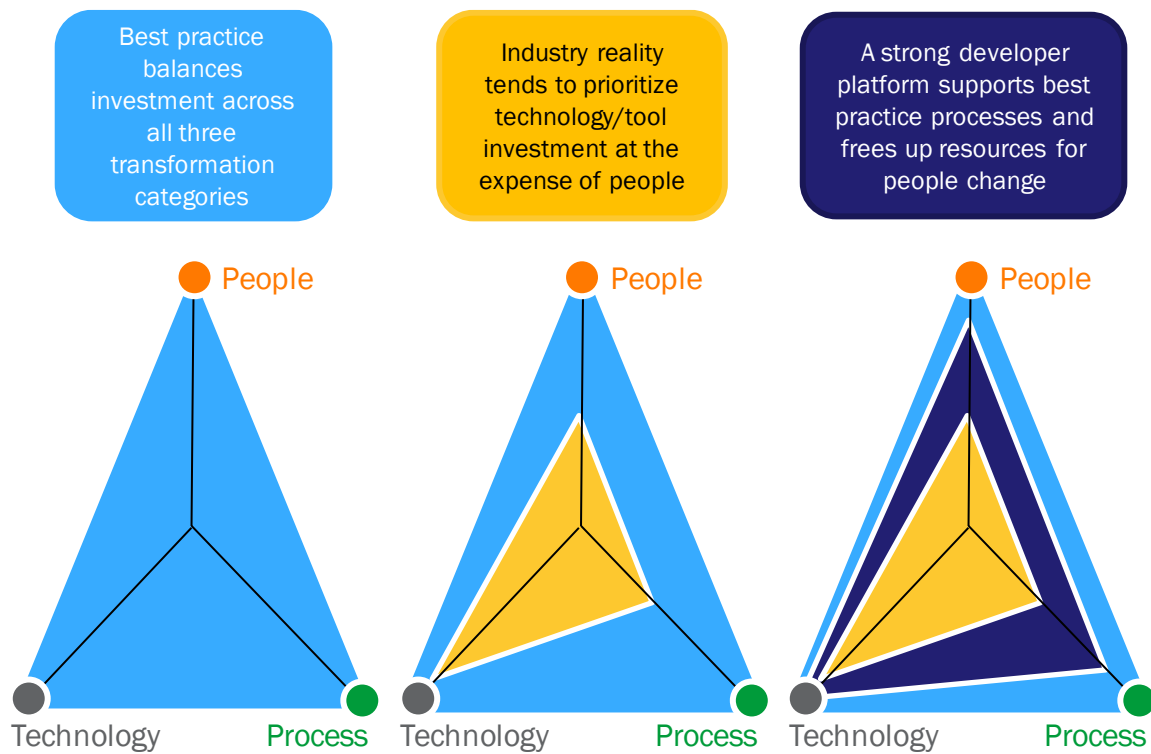
2.1 Businesses must transform themselves into software companies in a digital age

Companies succeed or fail on the basis of their software development and delivery capabilities in today's digital world. Software drives customer delight in products and services. It is the source of competitive differentiation and it enables business agility, safeguarding enterprise survival in a rapidly changing business environment. Software holds the key to business value, and enterprises must therefore transform into software companies in order to keep pace with the best producers of software in their fields.

Webscale companies have pioneered the cloud-native software development and delivery models that underpin software development success. Best practice includes an agile, DevOps approach to the software development lifecycle, a microservices-based development paradigm and a cloud-native ecosystem of tools that support both. The result is a new set of industry benchmarks for the speed and cost of software development, software resilience and availability, as well as lower infrastructure costs.

Enterprises that wish to best serve their customers, as well as outcompete their rivals through software, should adopt cloud-native software development and delivery practices. However, to do so, they will need to reskill and re-equip traditional software development organizations, and/or build new teams, neither of which is an easy task. Developers that are used to working with traditional methodologies and tools must come to terms with an unfamiliar and more-complex cloud-native development paradigm, as well as new working practices and tooling. In the 'golden triangle' of people, process and technology change, the hardest to achieve is people/cultural change. This is the largest bottleneck in a transformation programme, yet it is the most critical for success. If enterprises want to deliver world-class software, then they must ensure that the transition from their current mode of development to the cloud-native mode is made as easy and as productive as possible for their developers. Otherwise, they risk spending significant effort on changes that fail to yield the desired results. On the other hand, it will be challenging to establish a new cloud-native software development capability through recruitment, given that the costs of acquiring skilled developers are high in an era of scarcity.

Figure 2:1: Balancing people, process and technology is the key to success

Source: Amdocs and Analysys Mason, 2020

2.2 It is challenging to attract developers and to maximise their productivity

In a software-driven world, developer lifetime value (DLV) is a critical measure of business success. Developers create the business value that delivers market leadership – they are among the most valuable of enterprise resources and consequently, their job satisfaction is paramount. The greatest challenge that enterprises face as they transition to becoming software companies is to maximise DLV by lowering developer acquisition costs and increasing their productivity and retention rates.
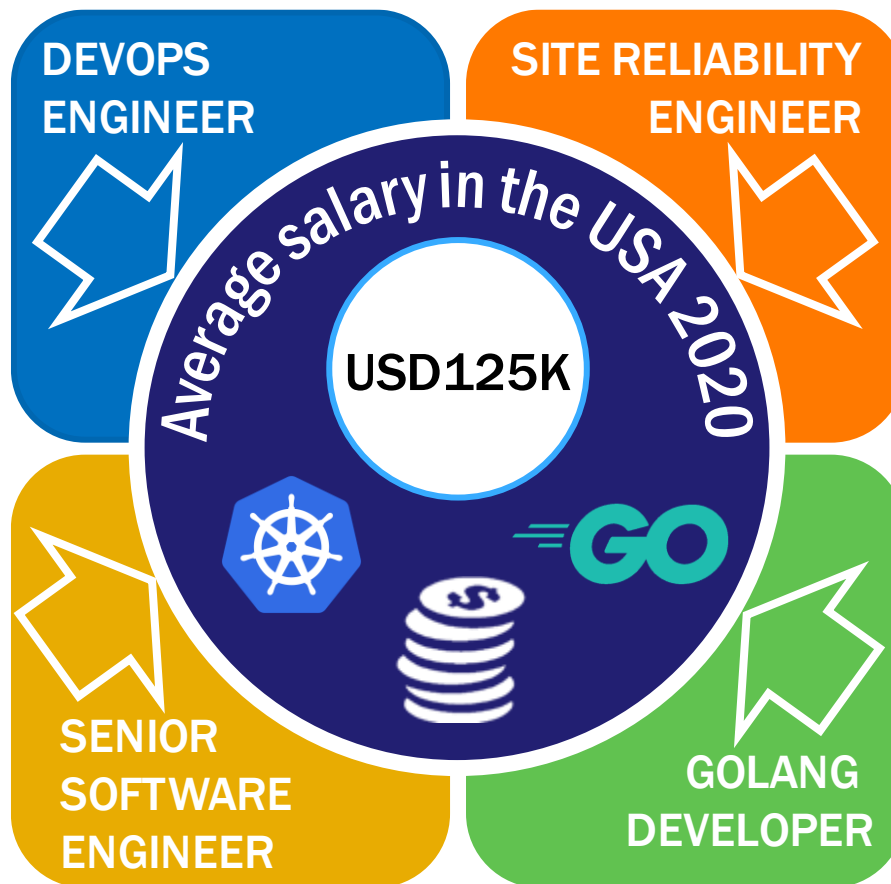
Enterprises must understand how they can nurture their developers' talent and expertise. Developers are creative people who often have a low tolerance for boredom and who may ask for 'at-will' contracts that allow them to terminate their employment at any time, on a no-notice basis'. They can command high salaries for their skills (see Figure 2), partly because such skills are in high demand and short supply. Developers can and will move on if their working environment is not attuned to their needs, for example, having the right technology support for removing tedious, non-productive tasks and for giving their creativity full rein. New hires must be helped to become conversant with enterprise-specific APIs, templates and best practices as quickly and painlessly as possible, without the need for onerous training courses. In addition, enterprises should ensure that existing developers can acquire new, cloud-native skills without encountering a steep learning curve. Both sets of developers must be given the best possible experience, provided with a large amount of freedom to work in the way that they prefer, with the tools that they like, while reducing the number of tasks that they find repetitive and low-value.

There is a natural tension between giving developers everything that they want to make them happy and meeting business requirements for governance and compliance. Enterprises face a conundrum: how do they ensure that developers are working within the parameters that have been set up to ensure that security and other business policies are not compromised, while not appearing to constrain developer choice in any way? A second

challenge for enterprises arises from the need to equip their businesses with cloud-native skills. How can enterprises achieve this effectively, minimising the cost and risk associated with recruiting, reskilling and scaling quickly in order to achieve the benefits of cloud-native software development faster?

The answer to both of these questions lies in a new type of cloud-native technology platform that can accelerate microservices development at a corporate scale. The starting point for such a platform should be the quality of the developer experience that it delivers.

Figure 2.2: Developers with cloud-native, DevOps skills command high salaries

Source: Analysys Mason, 2020

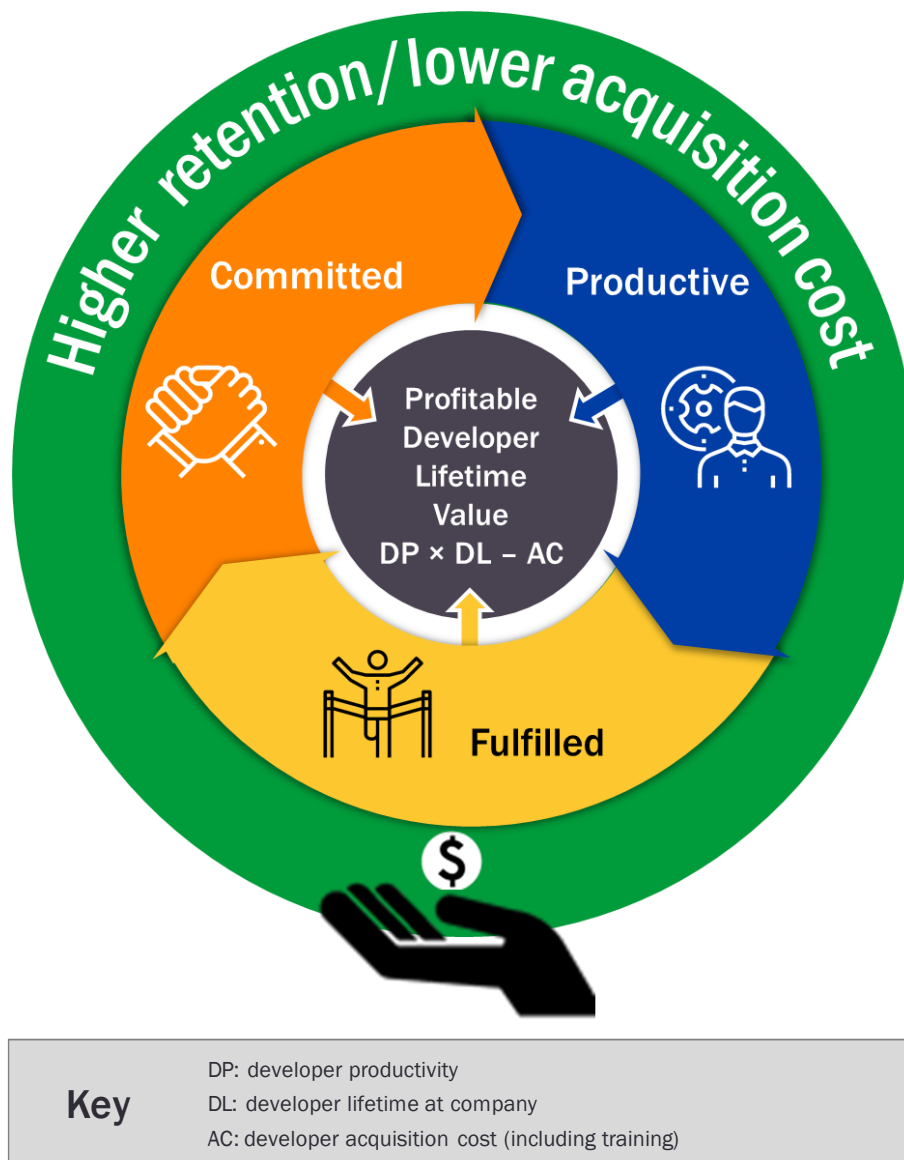# 3. Providing the right support for accelerated cloud-native development

3.1 Two key components are needed to establish a successful cloud-native development capability

Cloud-native development is the key to producing high-quality, resilient code at speed. Enterprises need to transform their organizations to support this strategic capability in two, interdependent ways. They must:

- transform their software development culture from a legacy, waterfall model-based way of working to embrace agile methodologies and DevOps
- introduce a software development and delivery platform that supports an optimal and continuous cloud-native developer experience and accelerates microservices development.

Both actions increase DLV by providing the right environment for developers to acquire the appropriate skills and to thrive, increasing their productivity and therefore value to the business. With the correct ecosystem focus and support, enterprises today can complete their cloud-native transformations in less than 5 years, compared to the 7 years that it took microservices pioneer, Netflix, to reinvent itself as a cloud-native, microservices-based software company.

Figure 3.1: The virtuous circle of developer experience for creating Developer Lifetime Value

Key	DP: developer productivity
	DL: developer lifetime at company
	AC: developer acquisition cost (including training)

3.2 Building a supportive cultural environment

Cultural change requires enterprise-level commitment and investment. It is not sufficient for individual teams to change their processes. The new, cultural way of developing software, and the new KPIs that measure quality and productivity in a cloud-native environment, need to be embedded at an institutional level in order to prevent the entire organization from slipping back into legacy practices.

Cultural change needs to be guided according to industry best practices, as well as reinforced and rewarded, if enterprises are to become capable of developing and delivering cloud-native software. Enterprises must actively support the way that their developers use cloud-native tools and technologies. It is not enough to simply change their job titles and expect them to learn agile methodologies in their own time because this will not result in a meaningful or lasting transformation.

The desired outcome of cultural change is to provide a best-practice developer experience in which developers feel:

- **empowered** to work in an agile, DevOps way, supported by tools, technologies and practices such as architectural patterns and data models that they have influence over. Developers should feel part of a community that has as its goal the safeguarding of developer creativity and passion.

- **psychologically safe**, able to make code changes without fear of having a detrimental effect on the system(s) that they are contributing to. Developers should feel that compliance is embedded in their DevOps environment rather than a function that they must build themselves – or which will be applied as a gating process in a command and control structure. This frees developers up to innovate while protecting them and the business with an environment-enforced safety net.

- **understood** as professionals with different IT tooling needs from business executives who want to work at arms' length from code. The developer milieu is the Integrated Development Environment (IDE), so they should have deep access to code when they need it, as well as to libraries and templates that make their lives easier when they do not need to access code.

3.3 Providing the right platform for accelerating development

Enterprises that are undergoing cloud-native transformation should support their desired developer experience in a way that does not divert resources from all-important cultural change initiatives.

Enterprises tend to adopt three sub-optimal practices when they start their cloud-native transformations. First, many enterprises draft in the 'superstars' in their developer environments, who spend large amounts of time and effort arguing about which version of which tools and technologies in the broad Kubernetes ecosystem they should include in their cloud-native developer platform(s). This approach skews resources towards technology decisions and away from resolving more-critical people and process issues. Second, some enterprises leave it to individual development teams and organizations to select their own tooling and do not consider how to ensure governance across the disparate set of platforms that are deployed as a result of this decision. Such variability can create technical debt – bug fixing, security flaws, rework – in production systems that integrate microservices that are built with inconsistent practices, tool versions and policies. Third and finally, most enterprises focus on the platform itself and not on how developers will use the platform. In other words, they neither use design thinking nor put the developer experience first, which leads to unhappy and unproductive developers who may simply leave and take their skills elsewhere.

An enterprise benefits when all its developers use a common platform, embrace common practices and policies, employ consistent tool versions and receive support for non-functional requirements. Developers will only adopt such a platform if it is compelling. The platform should provide developers with a psychologically safe working environment, enjoyable, productive and fun. To meet these needs, enterprises should consider an emerging class of accelerated microservices development platforms that provide a best-practice, cloud-native developer experience on top of industry standard, open-source-based Kubernetes tooling platforms, such as Red Hat OpenShift.

Accelerated microservices development platforms enable developers to be productive out of the box. The platforms come with pre-selected tools, which means that enterprises do not have to spend time on preparation. The tools are pre-integrated so that developers do not need to build integrations themselves, and every microservice that they produce is automatically integrated with other tools in the platform in a uniform way. Such platforms, therefore, provide the foundation for a standardised, enterprise-wide way of developing cloud-

native software. This means that all developers can be consistent in the way that they address non-functional requirements, including the application of data models or security or error handling policies, In addition, all microservices (regardless of the languages and the tools with which they have been developed) can be integrated safely because they all comply with the same policies. Consistency is critical given that each monolithic application may be decomposed into 50–100 microservices spread across different development teams when it is re-factored as a cloud-native application.

Key capabilities of an accelerated microservices development platform include the following.

- **Central curation of practices and tools**. The platform should be governed by a Center of Excellence (CoE), which ensures that decisions about tools and practices are made on an enterprise-wide basis. The CoE should incorporate enterprise practices in key non-functional areas (for example, for monitoring, logging and security policy implementation), which can be applied by all teams. By removing the variability in tools and practices that result from decentralised decision-making, enterprises that use an accelerated microservices development platform can help their developers to focus on creating business value while also helping them to feel psychologically safe.

- **Developer empowerment.** It is important that the platform is extensible and is able to evolve over time. Enterprises need to find ways to reconcile a common cultural conundrum: Gen-Z developers want freedom of choice and local autonomy or they will leave, but the business needs to control these choices for compliance, regulatory and operational purposes. Developers should feel that the platform is not the rigid arbiter of tooling and templated automation that enforces enterprise practices, but the living heart of their community. The platform's CoE should solicit contributions from the community and regularly update the platform to accommodate developer preferences and suggestions for improvement. The platform itself should have mechanisms for evolving and upgrading its capabilities, so that as new tooling, updates and templates are added, the platform automatically updates its code generators and libraries to reflect these changes, saving developer time and effort.

- **Mundane task automation.** The platform should remove as many boring, repetitive developer tasks as possible by providing a central catalog of automation templates and libraries of code generators. This feature addresses the cultural dilemma: from an enterprise perspective, it enforces governance by ensuring that every microservice produced in the platform reuses the same automation (effectively providing a consistent operational envelope for each microservice). From a developer perspective, it reduces the frustration associated with such tasks, improves job satisfaction and increases productivity, which enables them to spend more time on creating business value.

- **Quality engineering support.** Microservices testing is a key area in which the platform should provide automation. In a DevOps world, quality is built into software products from the start, and the responsibility for testing undergoes a 'shift left', where the emphasis is on finding defects in code as early as possible in the software development lifecycle and developers therefore become responsible for software quality engineering. The testing function moves from a separate, downstream testing organization into the hands of developers, who suddenly find that they are required to create test automation frameworks and test data sets. These are difficult and tedious to write at scale and developers need automated support. The platform should provide automated test frameworks and best-practice guidance in the creation of code stubs, for example, that ease the burden on developers and make building quality into their code as painless as possible.

Figure 3.2: Key capabilities of an accelerated microservices development platform

Source: Analysys Mason, 2020

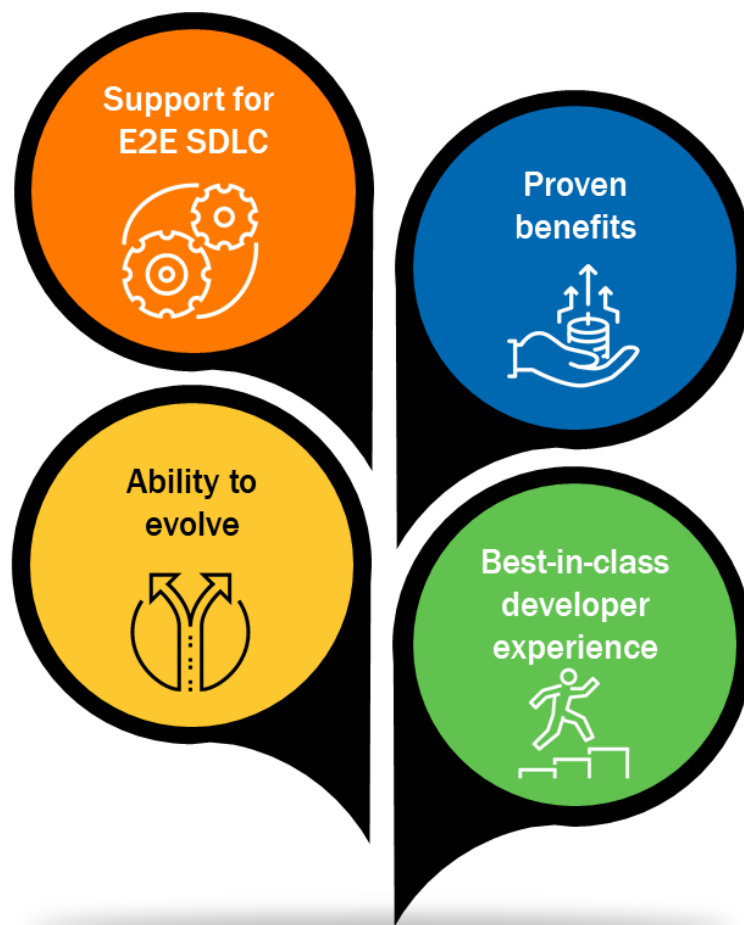## 3.4 Recommendations for managing the cloud-native development journey

The right accelerated microservices development platform is critical to cloud-native development success and therefore to business success. There are many advantages to procuring such a platform, rather than attempting to build one in-house. Buying rather than building will conserve valuable resources for the hard task of cultural change and it will accelerate time to market. This is because its repository of industry-tested best practices, best-in-class tools and ready-made automation enable developers to become productive as soon as they use it. The platform will have been designed to scale across organizations, with in-built resilience and performance.

As this is an emerging market, however, it is important to evaluate potential platform candidates carefully. Enterprises should consider the following recommendations.

- **Check that the platform supports the entire software development and delivery lifecycle (SDLC),** from end-to-end system design to continuous delivery and release management of microservices. Many solutions call themselves 'platforms' in the software development market but they do not all accelerate microservices development and delivery. Some are focussed on software delivery management only (that is, on continuous integration/continuous deployment (CI/CD) processes rather than on the end-to-end software lifecycle). Others may curate a set of tools from the Kubernetes ecosystem that together support the SDLC but expect developers to build tool integration themselves. Other platforms focus on value stream management but are oriented towards the business view of software development and do not address the developer experience.

- **Select an accelerated microservices development platform with proven benefits**, including the scale of support offered for developers/systems, the speed of onboarding developers and the quality of code that it produces. This means asking for access to the KPIs of organizations that already use the platform. Such KPIs will provide evidence of the speed with which a developer can become productive. The KPIs should illustrate the level of process and best-practice automation embedded in the platform and its impact on code defect density and other quality metrics, the size and complexity of developments that the platform supports, the level of microservices reuse that it encourages, and the velocity of its CI/CD process.

- **Evaluate the change mechanisms embedded in the platform** that will enable it to evolve as developers become DevOps-capable over time and are able to express opinions on tool choices, templates and further automation.

- **Evaluate the developer experience provided by the platform**. This may be challenging to define and test but it is a key selection criterion given that valuable developers are the key customers of an accelerated microservices development platform. Does the platform make developers feel empowered, enthusiastic, productive and psychologically safe? What is the developer retention rate of the companies that use the platform? What evidence is there that the platform facilitates and supports cultural change? It is important that any platform assessment does not focus solely on its technical features and tools but attempts to capture the 'soft' aspects that have a critical impact on developers' working lives.

Figure 3.3: Selection criteria for an accelerated microservices development platform

Source: Analysys Mason, 2020
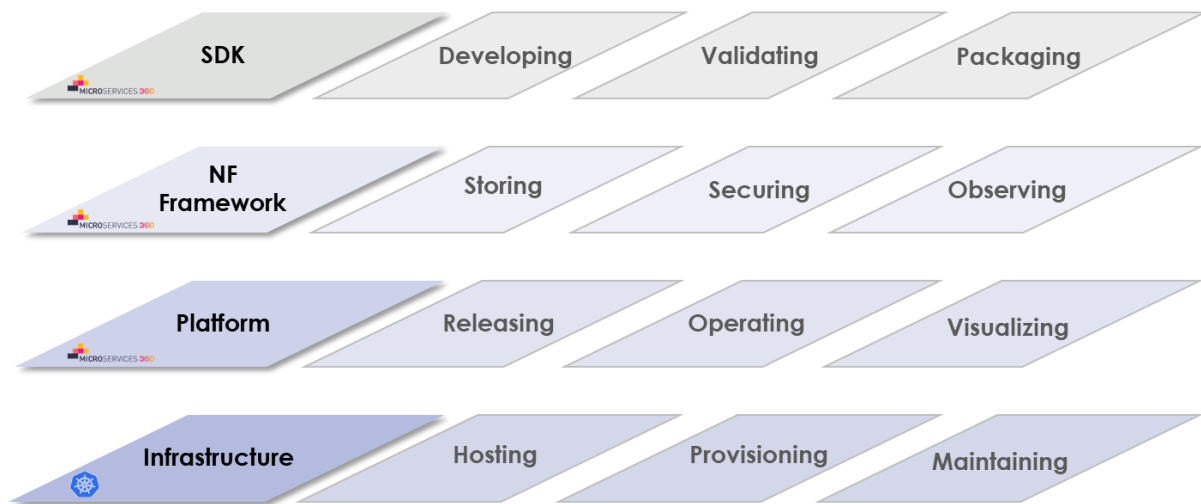
4. MS360 platform profile

Amdocs developed its MS360 accelerated microservices development platform to support its internal transformation into a DevOps-capable organization that is able to create and deliver world-class, cloud-native software for multiple cloud platforms, both private and public. Following customer demand, Amdocs is making MS360 available to customers that face the same software development challenges as Amdocs, and a number of enterprises are using it to underpin their own cloud-native software development and delivery processes. Examples include Tier-1 operators in North America and Asia–Pacific, as well as leading financial institutions in Europe and the Middle East.

MS360 has been designed to support a best-in-class developer experience from the perspective of a market-leading software company that is operating globally, and at scale. It incorporates emerging industry-standard, cloud-native tooling from the Kubernetes ecosystem, as well as industry best practices that have been distilled from experts and pioneering organizations in the cloud-native software development field. It supports the end-to-end software development and delivery lifecycle, from helping developer teams to generate new microservices or rebuild existing ones, to managing the release process. It pre-integrates hundreds of tools and contains a catalog of templated process automations to ease the burden on developers, it increases their productivity and value to the business, and enforces operational consistency and governance. It provides an open collaboration model so that developer teams can contribute to operational governance automation activities carried out by the MS360 CoE.

MS360 has been architected in four layers (see Figure 4.1):

- **A microservices SDK (Software Development Kit) for developers.** The SDK enables developers to work with their own tooling choices, which are integrated with the rest of the platform and therefore provide predictable ways of working (for example, error handling and circuit breaking, regardless of the tool used). The SDK determines the developer experience, supporting quality engineering and the massively parallel processing (MPP) development paradigm.

- **A flexible, ecosystem of industry best-in-class tools and automations** to support consistent non-functional application requirements. This includes observability (monitoring, logging), security, storage and compliance. Grafana, Splunk, Prometheus, Fluentd and AppDynamics, Couchbase and ElasticSearch, git, Swagger and Maven are some examples of such tools..

- **A microservices orchestration platform** provides the operational envelope for managing, governing and orchestrating microservices (for example, supporting the automatic provisioning of platform services and the workflows for the release (CI/CD) cycle). The platform's catalog sits here, governing microservice releases.

- **A foundational, infrastructure layer that provides the runtime for the platform and microservices/applications built on top of it.** This runtime enables the platform to run in multiple cloud environments.

Figure 4.1: MS360's four-layer architecture

Source: Amdocs

Amdocs provides a broad portfolio of services as part of its MS360 solution – from consulting, training and migration services to Day2 managed operations, including FinOps. MS360 has been developed and tuned when deployed on partner platforms. Some examples include the following.
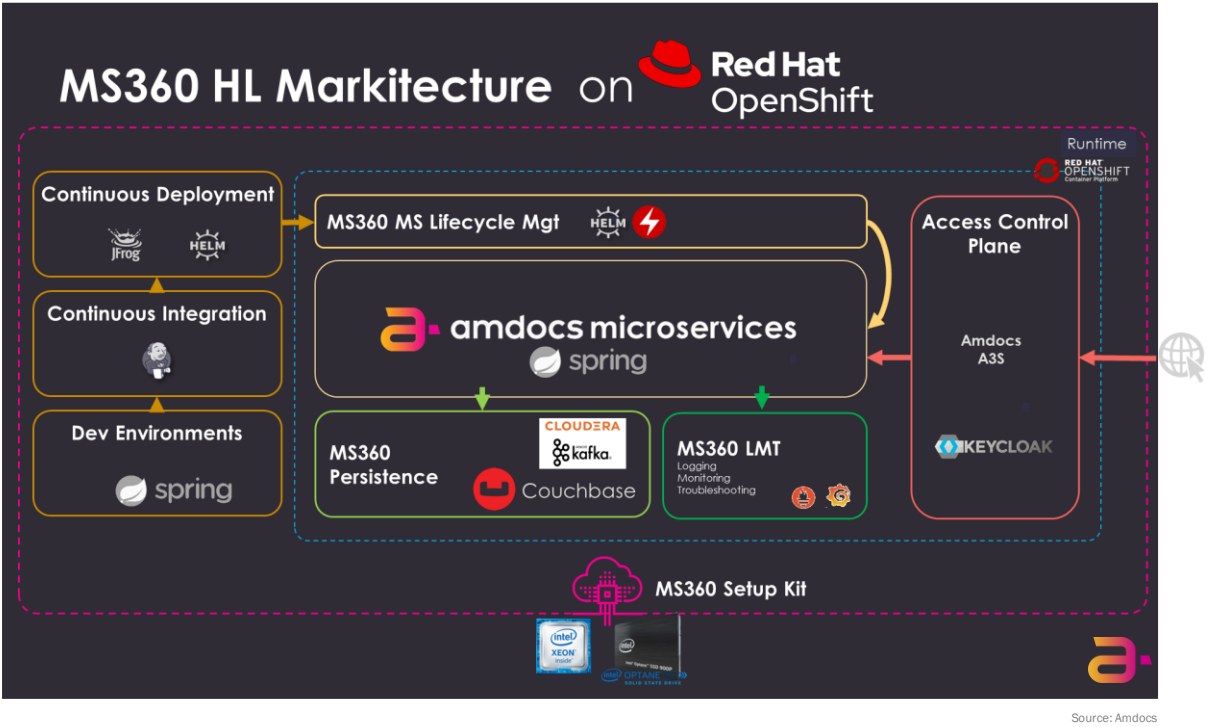
Red Hat

Amdocs and Red Hat have a strategic partnership. Red Hat OpenShift Container Platform is a leading commercial distribution of Kubernetes container orchestration and Amdocs has certified MS360 on it (see Figure 4.2).

Intel

Intel's strategic relationships with both Amdocs and Red Hat have paved the way for numerous performance, innovation and cost-efficiency improvements to how the MS360 platform runs on OpenShift and Intel-based servers. The companies' combined insights, investment in open-source software and technology alignment have helped Amdocs to deliver leading-edge innovation to its customers on a trusted and supported platform, while also providing total cost of ownership (TCO) efficiency and flexibility.

Figure 4.2: Markitecture on Red Hat OpenShift and Intel

Source: Amdocs

5. Conclusion

Cloud-native software development plays a central role in any business's competitive differentiation in a digital era. All enterprises today are having to act like best-practice software companies, able to produce high-quality code efficiently and at speed.

Successful organizational change is imperative if companies are to become expert at producing cloud-native software, but this remains the single-largest challenge that enterprises face when they start their development and delivery transformations. Software developers that have the right skills are an expensive and scarce resource to acquire, onboard and train. Establishing a best-practice, cloud-native software organization requires significant time and effort, the extent of which is often underestimated by organizations. It is imperative that companies invest heavily in the people aspect of transformation, despite the temptation to start with the apparently 'easier' task of identifying the new cloud-native tools and technologies needed to build and deploy microservices.

By delegating tools and technology choices to an accelerated microservices development platform, enterprises can free resources to focus on organizational change, which will significantly improve the velocity of organizational change at scale. An accelerated microservices development platform can harmonise and disseminate best practices across the organization while providing congenial support to the working lives of developers. The platform should provide developers with a choice of ways for achieving corporate goals (it is counterproductive to over-control them), while enabling the consistent application of the company's policies through automation, tool integration and the removal of tedious tasks that reduce developer productivity.

Developers that feel empowered, psychologically safe and creative are likely to remain with their organizations longer, contributing profitably to the business, which will lower talent acquisition costs. An accelerated microservices development platform is therefore a critical enabler of high DLV and a key indicator of a business's commitment to digital transformation.

6. About the author

Caroline Chappell (Research Director) leads Analysys Mason's Cloud and Platform Services practice which includes the Cloud Infrastructure Strategies and Data, AI and Development Platforms research programmes. Her research focuses on service provider adoption of cloud, and the application of cloud technologies to support digital transformation in telecoms. She is a leading exponent of SDN and NFV and the potential that these technologies have to enhance business agility and enable new revenue opportunities for service providers. Caroline investigates key cloud challenges and helps telecoms customers to devise strategies that mitigate the disruptive effects of cloud and support a smooth transition to the digital era.

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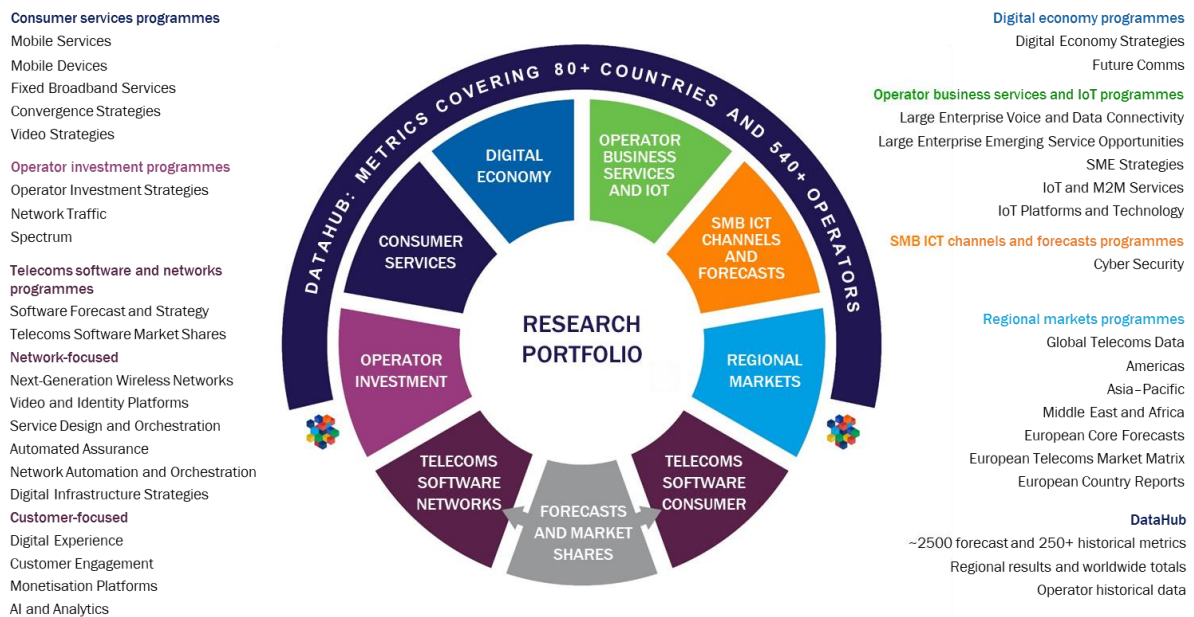**Customer-focused**
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Americas
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Middle East and Africa
European Core Forecasts
European Telecoms Market Matrix
European Country Reports

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Regional results and worldwide totals
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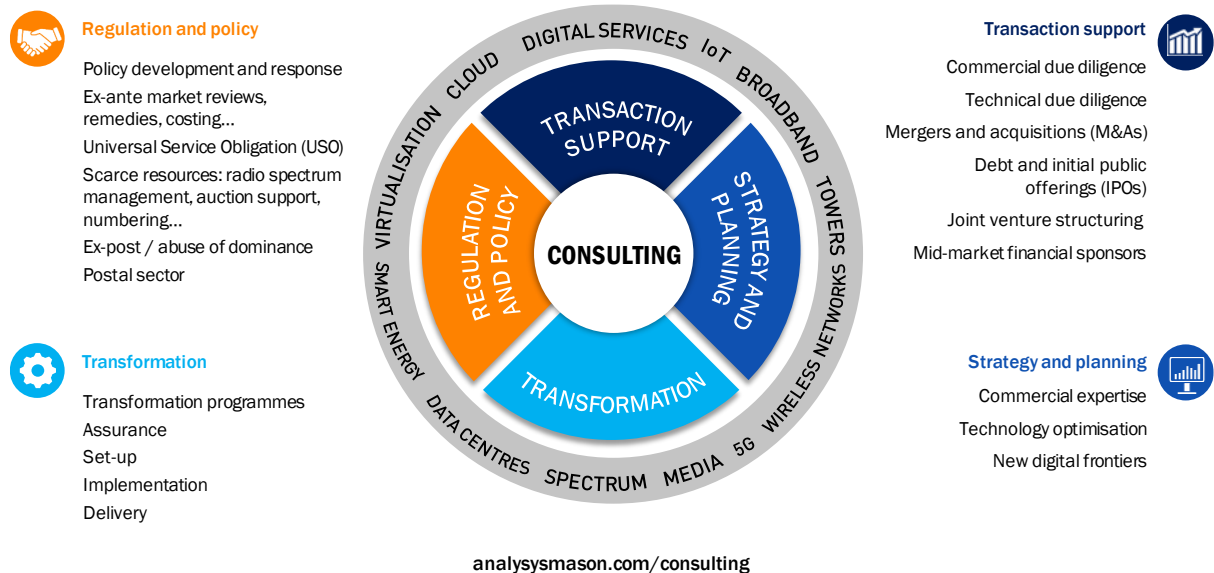
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Ex-post / abuse of dominance
Postal sector

Transformation
Transformation programmes
Assurance
Set-up
Implementation
Delivery

Transaction support
Commercial due diligence
Technical due diligence
Mergers and acquisitions (M&As)
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Commercial expertise
Technology optimisation
New digital frontiers

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