

Cloud Native Applications: The Intersection of Agile Development and Cloud Platforms



Overview

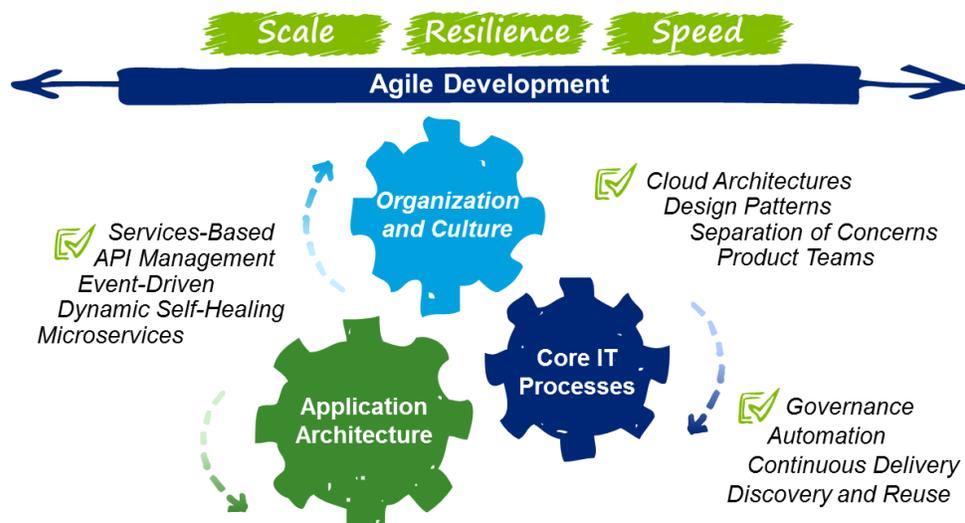
An increased desire for rapid and scalable capability delivery has shifted focus to Cloud as an enabler of effective application development and deployment. The integration of Agile into a Cloud Native application life cycle process may not consistently allow an organization to more rapidly and reliably develop and scale applications. Product alignment concerns, and a lack of collaboration between operations and development teams, are often the primary culprits in today's increasingly complex Agency environments.

So how can an Agency build, deliver, and operate resilient software systems more rapidly, at lower costs, and at scale to meet mission requirements?

F1.0 Critical Success Factors

The answer may lie in an Agency's ability to adopt an integrated approach combining Agile methods, application architecture decisions, and modifications to an organization's core IT processes (depicted in **F1.0**), in addition to organizational and cultural shifts. Agencies should consider alignment of development staff to products, and infrastructure to offerings, optimizing resource allocation. An organization's capacity to execute these adjustments can significantly improve speed, scale, and resiliency objectives.

This report presents both a strategy regarding how an organization can adopt an integrated approach into the Cloud Native application life cycle, and how it can effectively realize scale, speed, and resiliency objectives moving forward.



The Importance of Application Architecture

The use of design patterns enables application architects to design applications for their intended resiliency and scale requirements. In addition, design patterns can play a critical role in accelerating delivery cycles for software. For the past few years the trend has been Cloud First – this is now changing. Cloud First has evolved from migration of applications to becoming Cloud Native.

“The Cloud First approach applies to application, design, including stateless execution, frugal resource consumption, horizontal scalability, and instrumentation.”

Gartner – “How Private PaaS Can Begin to Transform Your IT”

Cloud Native provides organizations with the capability to rapidly develop and deploy software that adapts to changing operational conditions automatically. The skilled use of patterns in application architecture is necessary to accomplish speed, resiliency, and scale for applications.

- **Speed** – Narrowly focused services are at the core of design patterns, which are the building blocks of applications and critical to rapid application deployment
- **Resiliency** – The ability for a system to gracefully handle and recover from failures
- **Scale** – A system with scalability is one that can handle increases in load without impact of performance

F2.0 Four Stages of Cloud Native



Organizations operate complex portfolios of applications, from legacy monoliths to forward-leaning, mobile-enabled Cloud solutions. The Cloud Native approach is tailored to the portfolio and desired outcomes the organization is trying to achieve. The integration of design patterns into the application development life cycle occurs at different stages depending on the type of application, depicted in F2.0 above. For example, a new application developed for the Cloud can incorporate design patterns in the initial design and carry those patterns throughout the lifecycle. If an organization is dealing with a legacy application moving into the Cloud, then re-architecting may likely be a better solution.

Patterns play an important part in this evolutionary approach to Cloud migration and the journey to Cloud Native.

There are certain patterns that apply to speed, resiliency, and scale, and it is important large enterprises take a standard approach to using these patterns from the beginning of an application’s life cycle to the end. This offers a holistic approach to Cloud Native application design; application scenarios tie in with patterns which align to desired outcomes; evidence of the overall evolution of the Cloud First way of thinking to Cloud Native.

Integration of Design Patterns and Agile Development

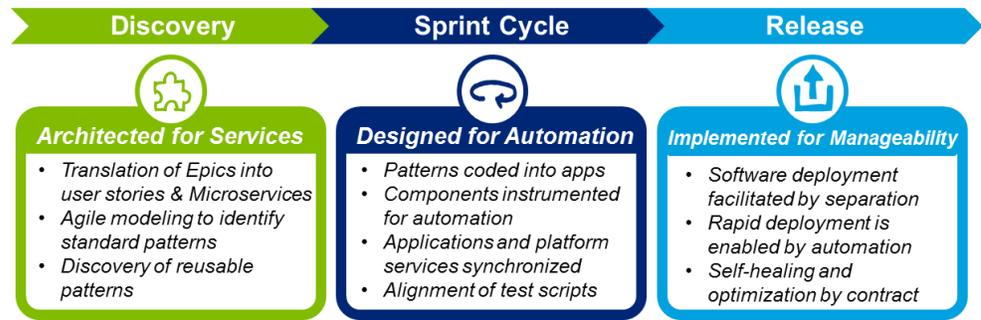
The use of the Agile has become more prevalent and, in some cases, prescribed within government agencies. Many organizations fall short in understanding the broader transformation that may need to occur in order to realize the full benefits of Agile application development.

In the early phases of the lifecycle, organizations can incorporate thinking from a pattern perspective for better downstream outcomes (as seen in F3.0) and each Agile phase should consider the use of architectural patterns. The piece of the puzzle many organizations miss is that it’s not only important to think about pattern choices in the beginning, but also to carry them through the entire Agile methodology in every phase. Incorporating patterns in the requirements phase leads to better scalability (GateKeeper and Static Content Hosting), including pattern choices in code (Indexed Tables, Materialized view and Priority Queue), and pattern alignment with rapid deployment via automation.

It is not enough to have just an Agile delivery process; those organizations that miss this relation are falling behind more successful organizations.

DevOps, or Development and Operations, is a practice that emphasizes the collaboration and communication of both developers and IT professionals to foster an environment for fast and reliable product delivery. DevOps execution has substantial benefits to be gained by adopting the Cloud Native approach. Self-contained applications that don’t have interactions with others are simple Cloud use cases, but organizations are realizing this is becoming increasingly more difficult because applications are integrated with each other. The achievement of DevOps objectives requires that the organization understands and plans for modifications to make it work.

F3.0 Agile Delivery Process



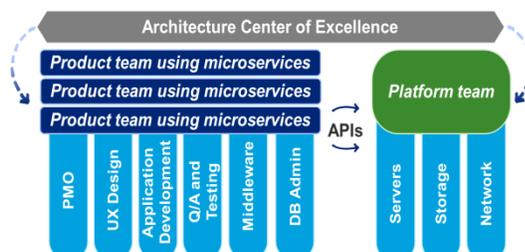
Adaption of Core IT Processes

An organization's ability to realize the full benefit of Cloud Native using Agile development requires focused transformation of the organization's existing core IT processes. The need to architect, develop, deploy, upgrade, and maintain applications in an environment that demands rapid capability delivery at increasing levels of scale requires traditional means for conducting change/configuration management, application management, and release management, among others, to adapt to Agile. Effective organizations have adapted core IT processes to facilitate the agility and speed required to realize the full potential of Agile development.

Addressing Organizational Change

Cloud First represented an initial shift in the operating rhythm and organizational needs for many government agencies. Advancement to Cloud Native continues this evolution and requires organizations to evaluate and optimize their structure, culture, and workforce. Agile application development for the Cloud requires emerging skillsets from application architects, developers, and IT operators. As seen in **F4.0** below, achieving organizational alignment is also critical to effective Agile application development in the Cloud. Implementing an Architecture Center of Excellence can ensure consistent transformation and alignment across product teams, platform teams, and the broader organizational goals.

F4.0 Organizational Alignment



Implementation Planning and Next Steps

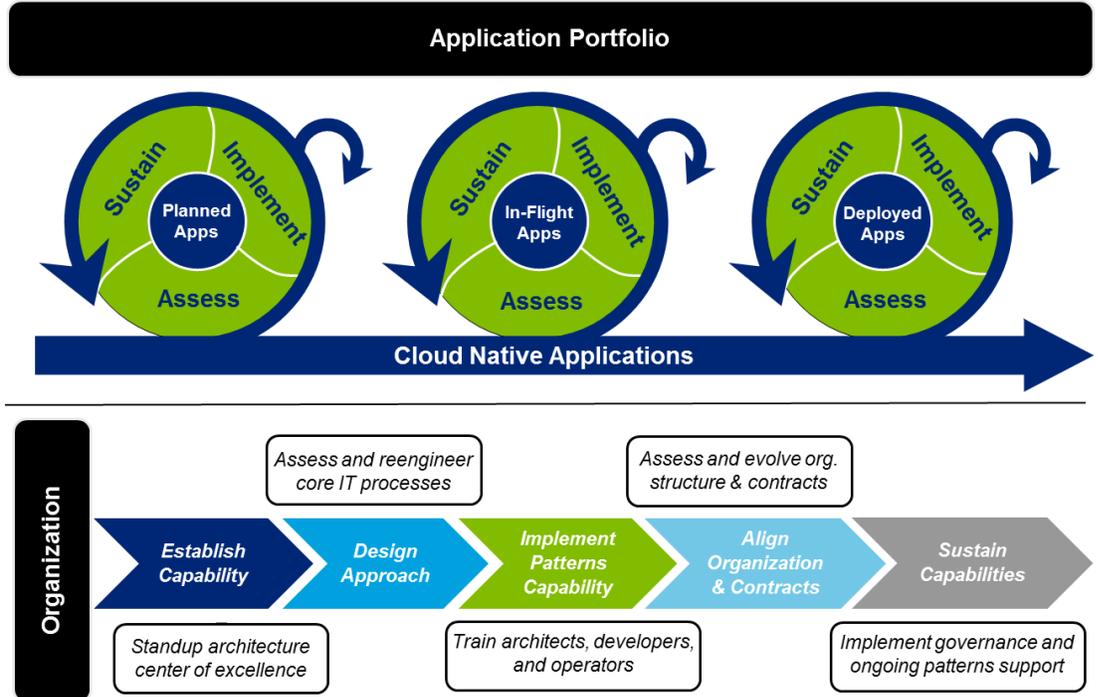
Integration of Agile into the application development life cycle has the potential to yield powerful benefits across multiple verticals. As the first step toward integration, CIOs and CTOs may consider conducting a rapid Cloud Native assessment to identify current state development processes, organizational structure and development alignments. Based on the assessment results, a detailed implementation roadmap can be created to prioritize modifications to the application portfolio and organization based upon expected impacts.

Execution of the implementation roadmap begins by navigating a pilot application through the process. Based upon observed outcomes and lessons learned, Deloitte is then able to steer your organization's application portfolio through the assessment, implementation, and sustainment phases.

Starting with applications in the planning phase, then proceeding with applications that are in-flight or previously deployed, a process is conducted to review, modify, test and deploy in order of organizational priority (depicted in **F5.0**). Changes to the organizational structure and product team alignment, including formation of an Architecture Center of Excellence, play a critical role throughout the process. It is the organizational modifications that lead to an implemented patterns capability, critical structural alignments, and long-term capability sustainment for future iterations.

With significant experience across the federal technology portfolio, Deloitte understands the mission, requirements, processes, systems and operating realities faced by federal agencies in addressing the hurdles of Cloud Native application development and operations. Leveraging coordinated alliance relationships, we offer field-tested insights and industry-leading practices based on the latest technology and business innovations.

F5.0 Implementation Timeline



Deloitte brings federal leaders an industry perspective and deep hands-on technology experience shaped by many years of supporting organizational transformations, both technical and non-technical. We understand the larger strategic environment that federal agencies operate in as we collaborate with CIOs, CTOs, and mission organizations alike to rapidly deploy, iterate, and scale resilient applications in Cloud environments. Our experiences have taught us that treating technology as an enabler of achievement rather than the end-game leads more often to accomplishing an organization's goals, and we invest time and effort in tailoring our methodologies and approaches to the specifics of an organization's environment.

Contact a member of our Deloitte team to learn how your organization can navigate the Cloud Native with Agile approach to facilitate a more effective development life cycle.

Contact us



Doug Bourgeois
Director
 Tel: +1 571 814 7157
 Email: dbourgeois@deloitte.com



David Kelly
Specialist Leader
 Tel: +1 571 882 6507
 Email: dakelly@deloitte.com



Thomas Henry
Manager
 Tel: +1 571 814 6541
 Email: thhenry@deloitte.com

www.deloitte.com/federal

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