

Agile Transformation for IBM Mainframe Application Portfolios – Part 1

Abstract

IBM Z mainframes continue to support key business processes across industries. With the fast pace of digital transformations across industries, organizations are keen to leverage Agile methodologies and DevOps practices for their mainframe portfolios that form the backbone of their business operations. Most of the mainframe applications have been developed years ago. The building blocks of these applications - Online transactions and batch jobs - map to business functions and hence the enhancements happening in these applications can be brought into Agile methodologies to deliver business value.

This paper covers the portfolios for which IBM Z Mainframe is used for development, testing and deployment of traditional workload. Part 1 of this paper lists the trends observed in Agile transformation for mainframe portfolios and provides a list of factors that can help in creating a roadmap. In the next part, we shall explore the DevOps tools and technologies for the mainframe environment along with a guideline for the choice.

Including mainframe portfolio as part of the Agile DevOps transformation

IBM mainframe systems support core business processes and emerging digital needs across industries. Many enterprises including banks, financial institutions and insurance companies are undertaking Agile transformations for their mainframe application portfolios and are adopting DevOps tools and automation. Reasons for such initiatives are:

- The distributed portfolios in these enterprises that host the systems of engagement layer have fairly mature Agile and DevOps practices and are undergoing continuous changes. But the mainframe systems which form the systems of record still use Waterfall methods, leading to delay in time-to-market, and the enterprises do not realize the full benefits of the Agile adoption. Hence, organizations are keen to align the mainframe application portfolios and associated enhancements to business value streams and Agile methodologies.
- Automation in software development life cycle (SDLC) increases quality. Hence, mainframe organizations are interested to create a continuous integration and delivery (CI/CD) pipeline with tools and automation, on the same lines as distributed platforms.
- Agile and DevOps practices across the enterprises ensure uniformity in training and grooming. It helps the enterprises with aging mainframe workforce to train, retain and get the best out of the new teams.

Current ways of working in mainframe application portfolios

- Mainframe applications are typically comprised of online transactions and batch schedules. These applications integrate with the other enterprise applications through MQ, FTP and web services. The IBM mainframe application technology stack and its software products are diverse and are catered to by different vendors.
- Mainframe systems largely undergo functional and regulatory enhancements. Digital transformation initiatives now induce significant changes in these systems and associated integration mechanisms. But the frequency of releases are limited.
- Most mainframe teams use Interactive System Productivity Facility (ISPF) green screen editors and follow a typical

maintenance life cycle with quality gates. Most enterprises have elaborate operating procedures and key tools for software configuration management (SCM), incident management, job scheduling and monitoring. Code management during development and testing processes are strongly compliant with SCM processes. However, SDLC core activities such as analysis and testing are still mostly manual. Though the ISPF utilities can be used for analysis, the large, complex systems with limited documentation makes enterprises dependent on subject matter experts (SME). The re-use of project-based design documentation is limited.

- Mainframe application portfolios have limited regression test beds and test automation adoption. Test environments are pre-defined and are shared among business units based on project priorities due to cost constraints. Development work often has to wait for environment resources to be made free from production workloads.
- Some of the enterprises have complex workloads with technologies such as Assembler and these enterprises need highly experienced workforce for maintenance. As these senior employees retire, the risk of skill shortage for maintenance of these applications increases. Mainframe teams are typically not part of cross functional teams making cross learning and grooming difficult.

Recent trends in mainframe Agile transformation

1. Enterprises have introduced Agile practices in the SDLC for mainframe based application managed services (AMS) work and have started to reap benefits with the process changes. Success factors observed in these transformations are
 - Top down strategy with a robust multi-year roadmap
 - Consideration of process and organizational changes as key change drivers
 - Rigorous empowerment of the workforce with training on Agile methodologies and support from Agile coaches
2. Some enterprises are piloting Agile practices and DevOps tools in a specific portfolio or at the project level, while Waterfall methodologies co-exist.
3. Several enterprises are willing to invest in DevOps tools. When some of them are mulling over procurement due to technology debt and return on investment considerations, some enterprises are in the initial stages of implementation after procurement.

Decision factors for Agile transformations

Enterprises can decide on the viability of Agile transformation for their mainframe portfolios based on the technology strategy and work composition. An Agile transformation can be beneficial if:

- The organization’s core IT systems are mainframe based and these systems form a major part of the IT landscape
- Mainframe is part of the strategic roadmap of the organization’s future
- Enhancements constitute a major portion of the AMS work
- Enhancements can be classified as large, based on effort (50 person days or more)* and business value

The various factors described in Table 1 help organizations draw up a roadmap for Agile transformation, covering prerequisite activities, pilots for various applications and roll out across the portfolios.

* As per TCS estimation guidelines. Effort values to categorize large enhancements may change depending on the metric guidelines used in the enterprises.

Enterprise Factors	
Requirement management process	Availability of streamlined process for business and IT requirements management and prioritization
Portfolio team structures	Flexibility and willingness to accommodate organizational changes
SDLC process	Adaptability of SDLC processes
Nature of Work	
Pipeline	Steady pipeline of work requests
Work request type	Composition of the work requests - enhancements / new features vs fixes
Scope of work	Focus of the enhancements - business value delivery involving multiple portfolios/ applications
Work originating from Agile portfolios	Work requests in Agile / DevOps enabled upstream portfolios resulting in changes to mainframe portfolios
Application Characteristics	
Functional clarity	Functional independence and interfaces of the applications - <ul style="list-style-type: none"> • Applications with stand-alone functionalities can be chosen for pilots/ proof of concepts. • Applications providing common services to other portfolios can be chosen for early roll outs.
Modularity of the application architecture	Modularity of the application components in terms of lines of code and call chain depth - Basic working software for mainframe applications in the Agile methodology can be an online transaction or a batch job. Lines of code and call chain depth of the underlying application components of the online transaction and JCL will determine the sprint definition.
SDLC Aids	
Technology currency	Version currency (n or n-1) of application technology and software stack.
Quality assurance	Availability of test environments and regression test beds including test cases, test data, test automation, debugging tools and associated governance framework.
Productivity tools	Presence of tools for code and data analysis, standard checking and code review.
Knowledge management	Availability of knowledge management framework and traceability aids.

Table 1: Key factors to be considered for Agile transformation



The Agile-DevOps implementation journey

Figure 1 describes a roadmap for Agile and DevOps implementation for IBM mainframe portfolios.

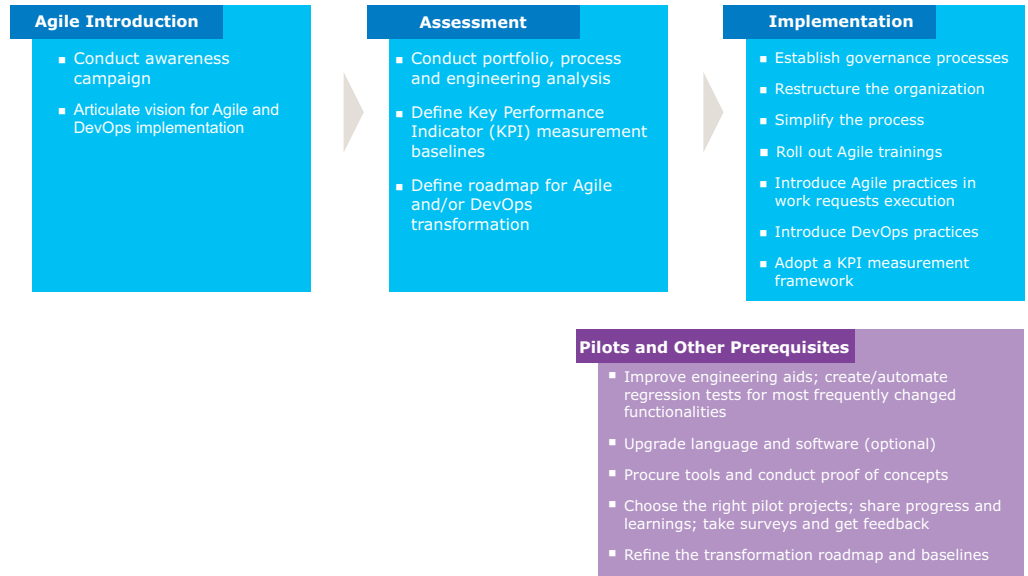


Figure 1: A typical roadmap for Agile transformation

Introduction of DevOps tools and their adoption as part of the Agile transformation is a two-phased approach, as shown in Figure 2.

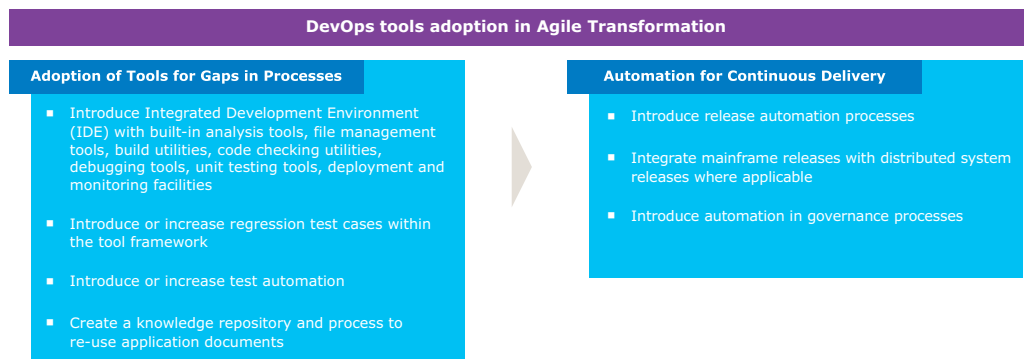
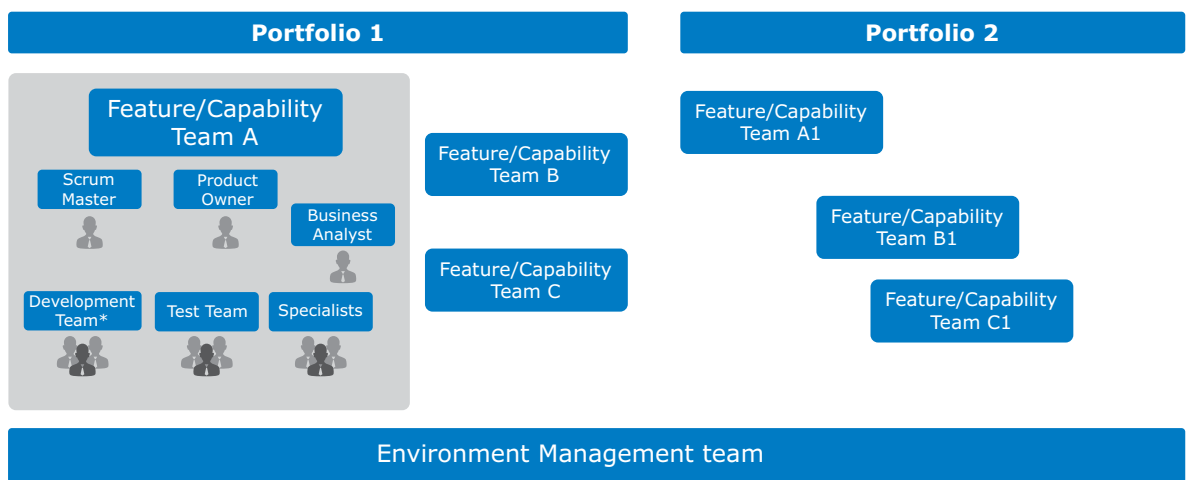


Figure 2: DevOps tools adoption as part of the Agile transformation

Organizational structure that enables Agile transformation

- Organizations that have undergone Agile transformation use a structure that is aligned to portfolios or lines of businesses and the boundaries between their applications and technologies have become increasingly thin.

- In particular, application SMEs, development and assurance teams are a single unit. The development team consists of team members with different technical skills and this helps in cross-learning.
- However, due to the heavy systems work involved, infrastructure and administration teams remain a separate horizontal, working on environment provisioning and monitoring. An example is depicted in Figure 3.



*Development team across technologies

Figure 3: Sample organizational structure

Recommended practices to facilitate Agile transformation

Practice	Recommendations
Customization of Agile Methodology	Guidelines and coaching for work request split up to help in initial adoption of Agile methodologies. (Refer to figure 4) Flexibility in defining sprint duration per work request till the assurance automation has improved. (Refer to figure 5)
Knowledgebase	Application wiki as a replacement for project documentation (Refer to figure 6)
Test environment management	Mandatory SCM load library control for all test environments. Portfolio-aligned development/unit test and system testing environments and common system integration and acceptance testing environments.
Test automation	Initial automation effort for critical/ often changing functionalities followed by automation in each work request for online and batches including comparison steps

Table 2: Recommended practices for Agile transformation

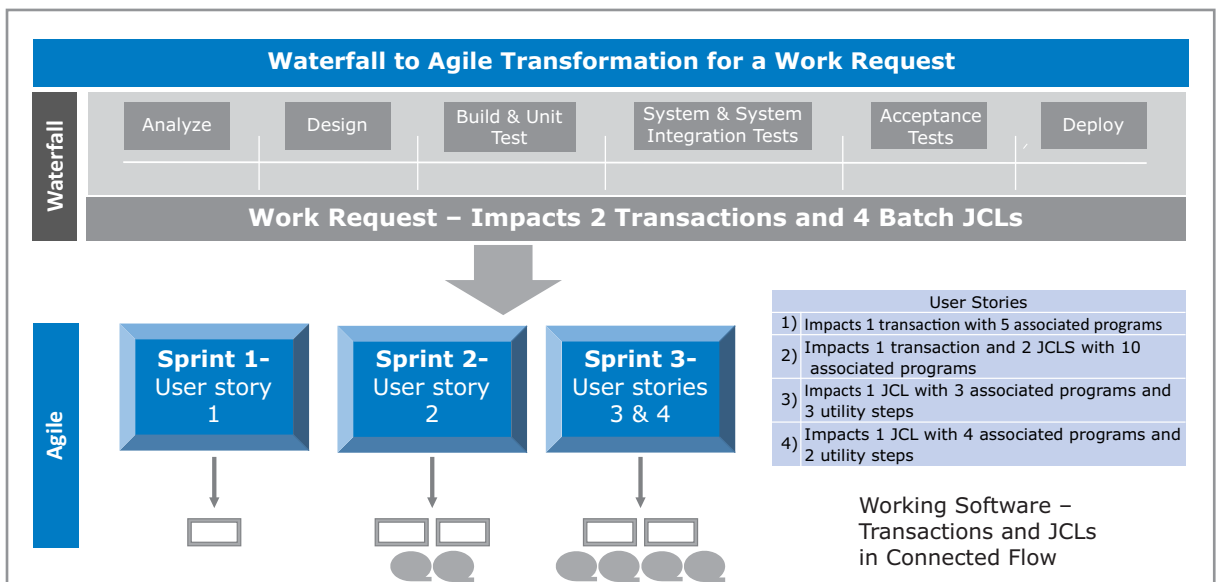


Figure 4: Representative sample for work request split up to multiple sprints

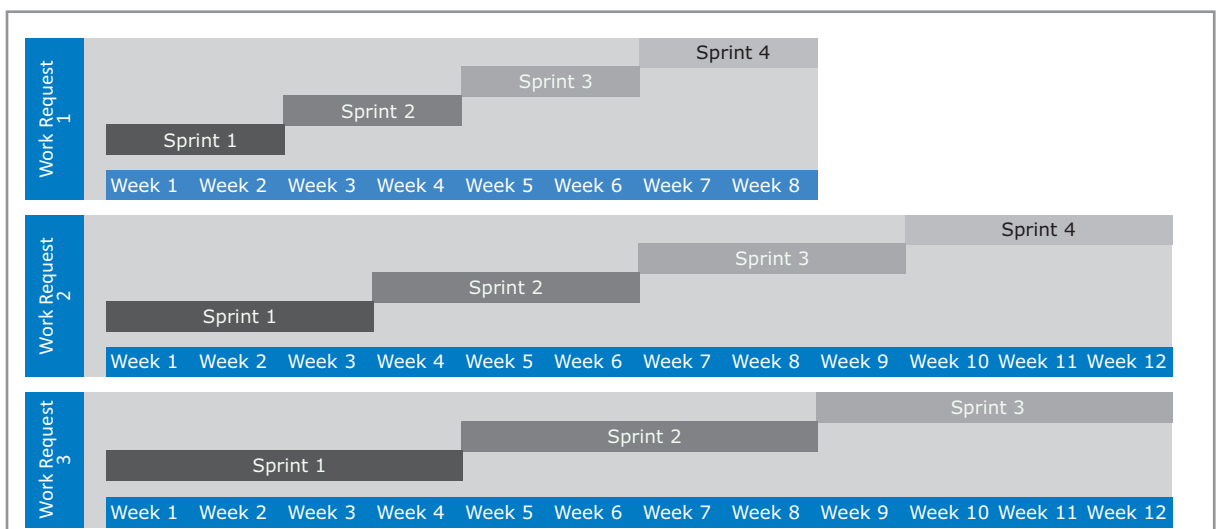


Figure 5: Sample work requests split into sprints of varying duration

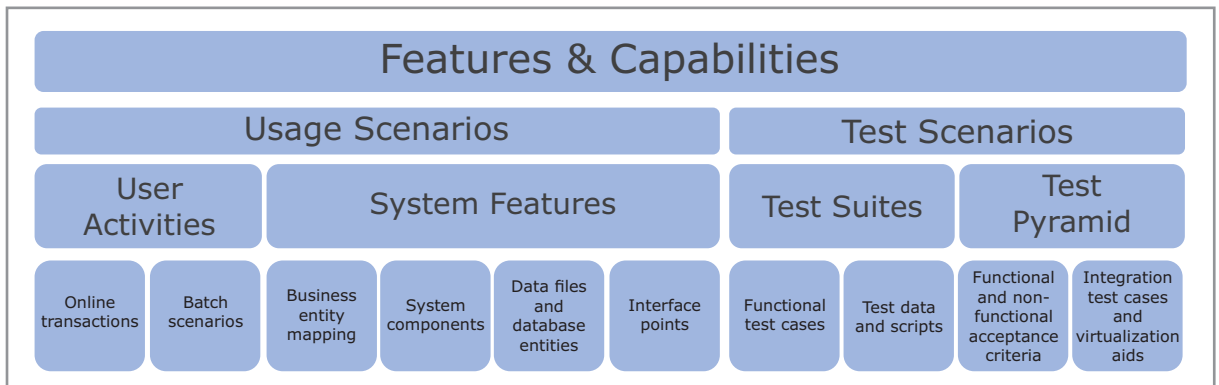


Figure 6: Sample template for Application Wiki

Organizational changes, process simplification, a clear definition of working software and Definition of Done (DoD) for the mainframe portfolio are the factors that can help organizations to start getting the benefits of Agile transformation. The tools and technologies for optimizing the SDLC engineering process and increasing the release frequencies will be explored in the next part.

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Rajlakshmi Krishnamurthi is an Enterprise Architect with the Alliance and Technology unit at TCS. She has 25 years of experience in IT solutions with expertise in complex modernization engagements. Her experience includes conceptualization of offerings and solution architecture, pre-sales and delivery support, consulting, asset creation and competency building. Rajlakshmi holds a Bachelor's degree in Computer Science and Engineering from Madurai Kamaraj University. She holds PMP and SAFe Agilist certifications.

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The team has been recently working on Agile and DevOps solution offering for mainframe portfolios by researching on the suitability of the Agile methodologies and DevOps tools for mainframe SDLC process. They have been involved in solution authoring, consulting and proof of concepts.

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