White Paper
Application Modernization PROGRESSION
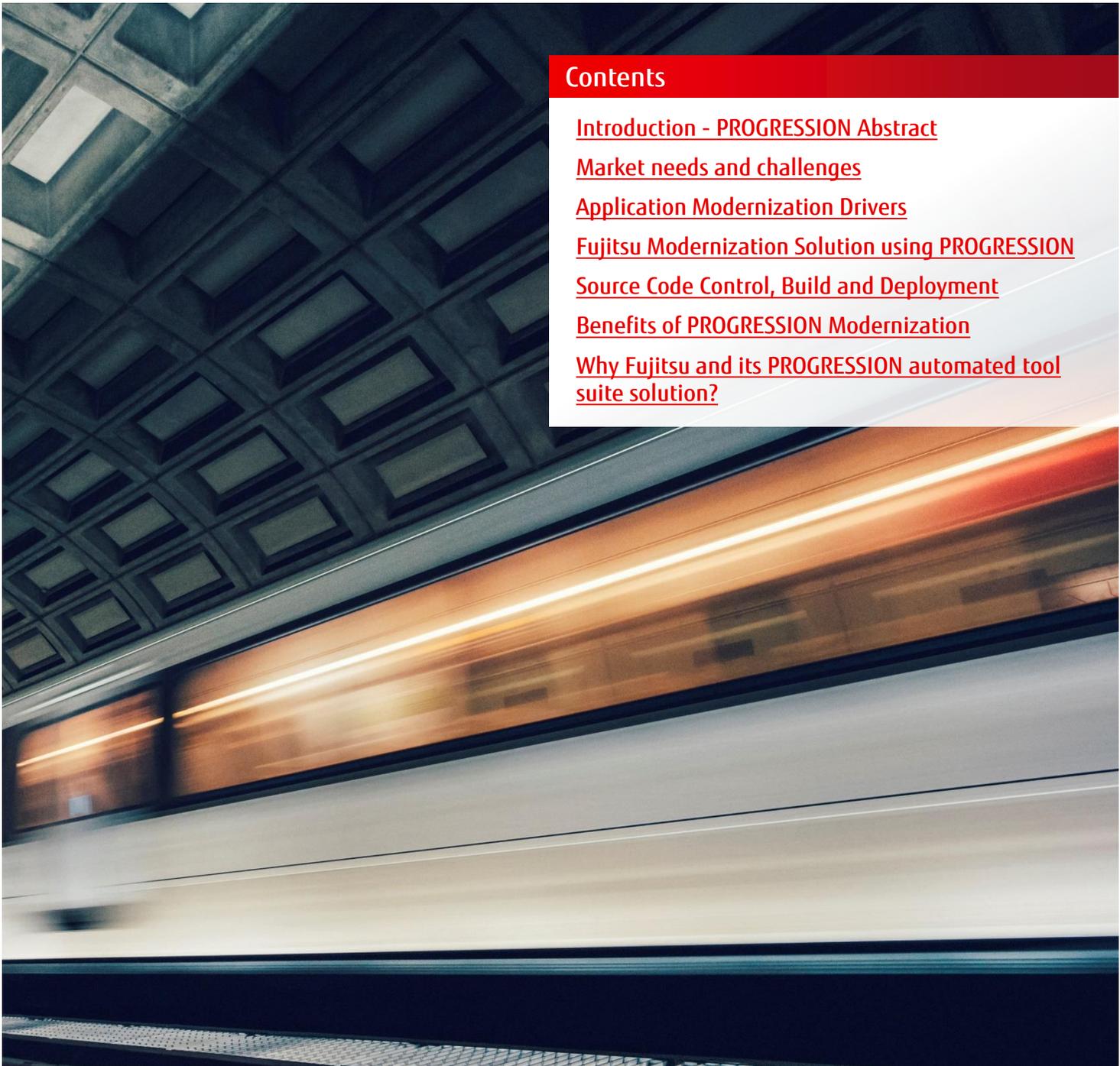
### Contents

Introduction – PROGRESSION Abstract

PROGRESSION from Fujitsu is an automated suite of migration tools based on Fujitsu knowledge of legacy platforms.

Application modernization has always been a high priority for CIOs. However for vendors including Fujitsu, selling application modernization solutions has not been an easy task because of high project risk and value from application modernization is generally hard for CIOs to foresee.

The latest application modernization solution from Fujitsu, PROGRESSION™, offers high quality, low risk and foreseeable value, all of which are achieved by a fully automated conversion tool suite.

This paper introduces the benefits of the PROGRESSION from Fujitsu automated tool suite and how Fujitsu America has successfully implemented projects using PROGRESSION. PROGRESSION from Fujitsu is an **automated** suite of migration tools based on Fujitsu knowledge of legacy platforms:

» Transform legacy assets to modern technology (Microsoft® platform)

» **Business Logic and Screens unchanged** – with new functionality and better agility

» Customizable templates for a full 3-tier Object Oriented .NET® thin client application

» SQL® server database (Oracle® and FEP possible)

» Cloud Ready

» **Owned**, fully **developed** and **supported** by Fujitsu

» **No license fee or runtime licenses**
  » Modernization projects are professional services engagements

» **Easily customizable** for unique customer requirements

» Legacy Platforms supported:
  » IBM® mainframe, UNISYS® mainframe, AS/400, HP® 3000

Mainframe migration using Fujitsu PROGRESSION

shaping tomorrow with you

FUJITSU
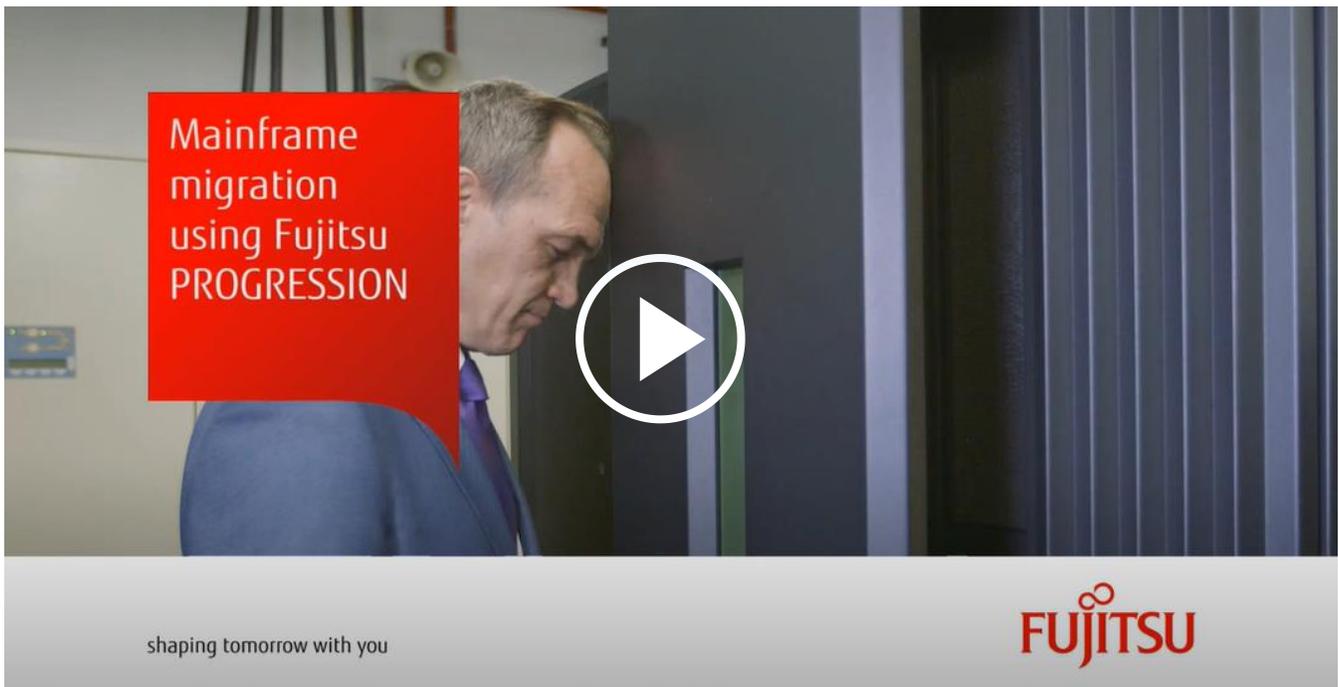
Market needs and challenges

Most large organizations rely on mainframe / midrange to run their critical systems. Modernizing legacy applications is one of the most important priorities for CIOs along with business process improvement, SOA, and others.[1]

The key reason for modernization comes from the fact that 75% of their development resources are employed simply to maintain existing applications, which leaves only 25% of development resources for innovation. Also experts in legacy platforms are getting scarce, and technology obsolescence is becoming a bigger issue year by year. For example, in the case of a midrange platform, 66% of AS/400 installations are seeing lack of trained staff as the biggest concern. Also more than half of AS/400 users are dissatisfied with green screen applications.

There is definitely need in the market, but one of the roadblocks for the application modernization business is risk.

Application modernization projects are complex. Actually 23% of modernization projects are canceled before completion, while only 28% finish on time and budget with expected functionality.[2]

The current system is hampering an organization's ability to increase its competitive advantage, extending time to market for new, innovative products, and increasing the risk of falling behind competitors as well as not meeting compliance regulations.[3]

71%

of today's Fortune 500 companies use mainframes

70%

of IT decision makers believe that less than half of the current applications can support the future digital strategy of their organization

40%

of mainframe experts are on the verge of retiring

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1 The Business Value of Legacy Modernization Published: July 2007. http://download.microsoft.com/download/E/9/7/E9734F87-C581-482A-AACA-2835DF48D40E/Business_ Value_Legacy_Modernization.pdf

2 Modernizing Legacy Systems: Software Technologies, Engineering Processes, and Business Practices By Robert C. Seacord, Daniel Plakosh, Grace A. Lewis ISBM 0-321-11884-7

3 Modernization clearing a pathway to success: The Standish Group International, Inc.

Application Modernization Drivers

Natural technology lifecycles drive the need to replace certain elements of corporate infrastructure on a regular basis. Some elements require upgrade more frequently, while others drive infrequent wide ranging change. Typically, the application layer of an organization's enterprise information systems fall into that latter category. Despite an infrequent need for technological change, applications do require certain functional investment, and at times, major change to maintain alignment to shift in enterprise level architectural tenets. While replacement can achieve that alignment in certain cases, specific environmental characteristics or drivers are present in other cases, pointing to Legacy Modernization as a better approach to application currency.

The following are some of those key drivers that are present when Legacy Modernization is among the most cost effective approaches to refresh older applications:

» **High costs** associated with maintaining and enhancing application on expensive legacy platform

» **Unmitigated risks** associated with running business critical application on unsupported hardware and software

» **Tedious and complicated development lifecycle** results in higher time to market for a new business requirements or from a regulatory compliance due to lack of productivity tools

» **Inflexible and closed architecture systems** hindering web-enabling and integration capabilities with contemporary platforms.

» **Limited options in hardware and software** from fewer (or single) vendors restricting the choices

» **Demographic issues relating to lack of skilled resources** on the legacy technologies which no longer form part of academic / research curriculums

Changing Workforce
Concerns about the aging workforce that deliver Mainframe competencies

Application Agility
Maintainability of application portfolio

Rising Cost
Higher cost of ownership

Future Roadmap
Architecting the IT infrastructure for the future

70% of IT leaders worry about the mainframe skills gap and increasing cost

Fujitsu Modernization Solution using PROGRESSION

PROGRESSION from Fujitsu for Mainframe to .NET modernization offers the best solution to support migration from legacy systems such as IBM Mainframe, AS/400, iSeries, Unisys and HP3000 to Microsoft.NET or Azure®. Legacy applications developed with languages such as COBOL®, RPG, VB, and Transact can be easily modernized to a newer platform such as Microsoft.NET C# or VB.NET. This modernization approach is an ideal way to capture hidden organization knowledge and migrate it to a new platform and revitalize business competitiveness.

For the most part, the application migration is automated using the PROGRESSION from Fujitsu migration suite for a modernization to the .NET platform.

The PROGRESSION tool suite is an automated migration solution that provides highly configurable options using parameters and templates, which allow implementing all coding techniques, standards and packaging. The use of the automated tool makes sure that there is a very high level of consistency in the resulting application, while minimizing the risk of introducing human error.

The modern 3-tier design of Fujitsu converted components ensures a complete and independent implementation of the presentation, business and data layer. The presentation layer migrates all user interface (screens) and related screen handling and validations into a C# ASP.NET Web Form application. Everywhere possible, common functionalities are implemented using shared common components. Although the new business logic is fully object-oriented, it retains the integrity of all existing business rules and behaviors.

The data layer is implemented through database objects and a shared Data Access Component that ensures the possibility of redesigning the new relational database without impacting the data access logic of the current system. This approach provides flexibility for future maintenance and enhancement of the application. This shared component is automatically generated based on the design of the old and new database.

Batch components such as JCL for an IBM Mainframe z/os are also migrated and deployed on a batch application server. Reports are redesigned using the new database and can be implemented using SQL Server reporting services or other existing reporting toolsets.

Our approach relies on extensive configuration and version management. At every step, a specific version of all components is retained making it easy to identify all changes that have been applied. In conjunction with the automated conversion suite, it is very easy to integrate ongoing maintenance into the test cycle by using change management tools that allow comparison and the merging of converted components.

Additional characteristics of our solution include:

» Automated tool assisted migration using the PROGRESSION from Fujitsu tool suite
  » No freeze needed for legislature changes and production fixes (code re-synch)
  » Generated code logic follow Microsoft recommended coding standard (no Cobol look-alike method (move, perform)

» Full automated testing (e.g. Regression) via continuous integration (CI) and continuous deployment (CD) (DevOps: SVN, Jenkins)

» Robust transactional model (DB locks, concurrent, conversational)

» Stability through full load balancing support

» No Fujitsu software upkeep maintenance fee (full customer ownership of all code))

» Flexibility to accommodate extensive database redesign (Data Access Layer)

» Microsoft .NET solution: Microsoft .Net Framework, C# language, Powershell
  » Windows Server®, SQL Server, Visual Studio®
  » Thin client Web Form application (multiple browser support)
  » Fully compliant with Object Oriented principles, SOA architecture (Web Service interface), WFC.
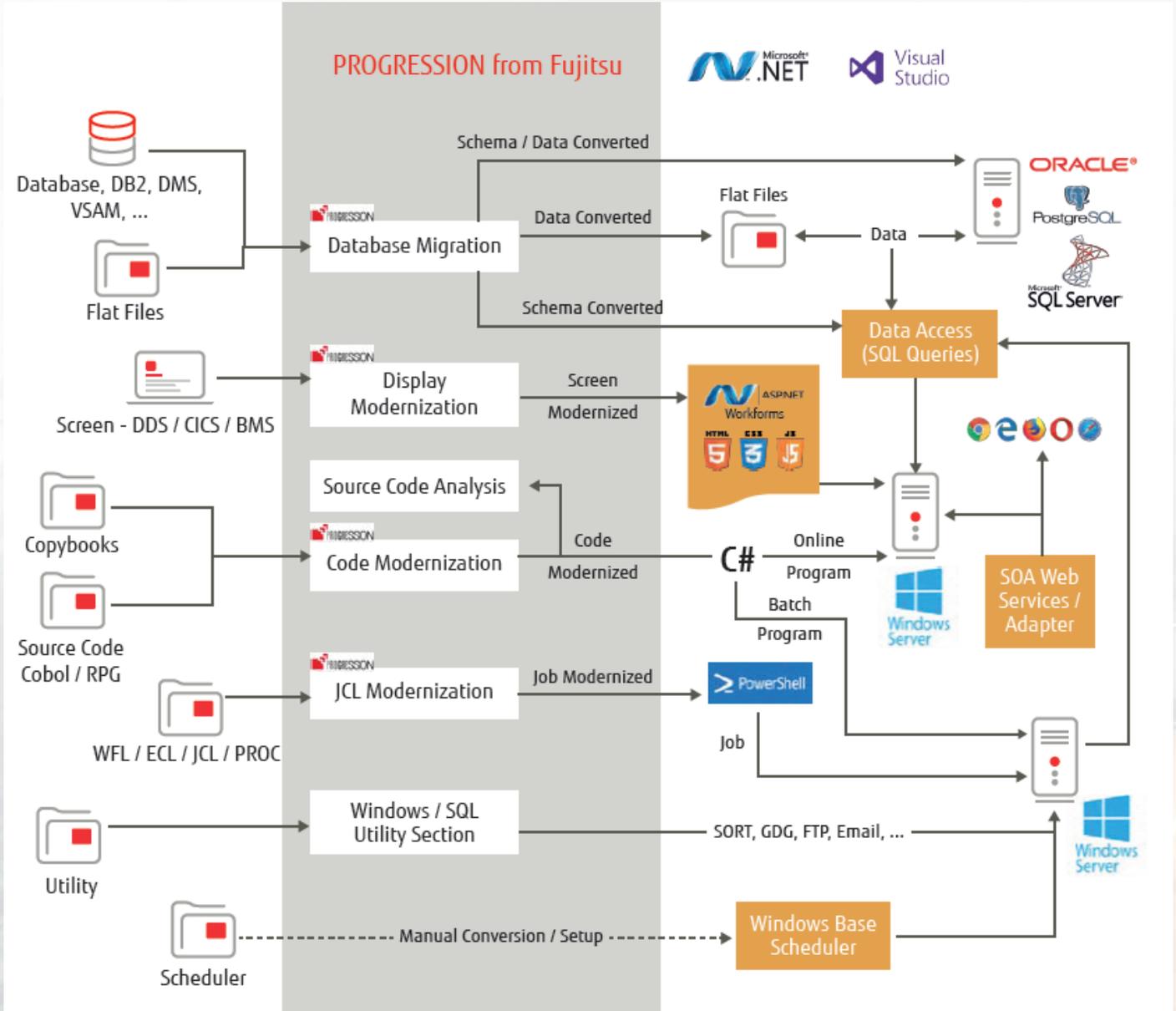
Sample project architecture using PROGRESSION for Mainframe to .NET

Source Code Control, Build and Deployment

The Fujitsu delivery methodology and PROGRESSION solution is source controlled and continuous integration platform agnostic. The PROGRESSION from Fujitsu team utilize Jenkins and SVN as part of its internal DevOps solution platform. Jenkins leverages MSbuild to build a .NET application; it does not require any specific software to be installed on the build agent other than the matching .NET framework. Jenkins will require the MSbuild plugin that is publicly available as an open source component.

As part of our converted code delivery package, we include Jenkins build scripts. This process is aligned with the current market standard has it relates to DevOps.

Fujitsu has been leveraging DevOps technique and automated processes for many years as part of its current Solution and successfully leveraged to deliver mainframe modernization projects.

The graphic (right) represents the overall Fujitsu internal PROGRESSION DevOps implementation, supporting the Continuous Transformation and Continuous Integration processes that could be leveraged during a typical modernization effort and thru all project phases to migrate and modernize customer's application and all its subsystems from Mainframe to the .NET platform. The "Code" step of the typical DevOps cycle is replaced almost entirely by the output of the automated code migration process using the PROGRESSION tool suite.

DevOps is important as part of the PROGRESSION from Fujitsu solution:
» Minimizes human error
» Shortens delivery process
» Offers control over the project lifecycle
» Integration of issues and rollback
» Fast issue resolution turn around
» Provides feedback quicker on result
» Controlled change in data access layer
  » Tool integration link between source control and commit
  » Added automated test
  » Added automated deployment
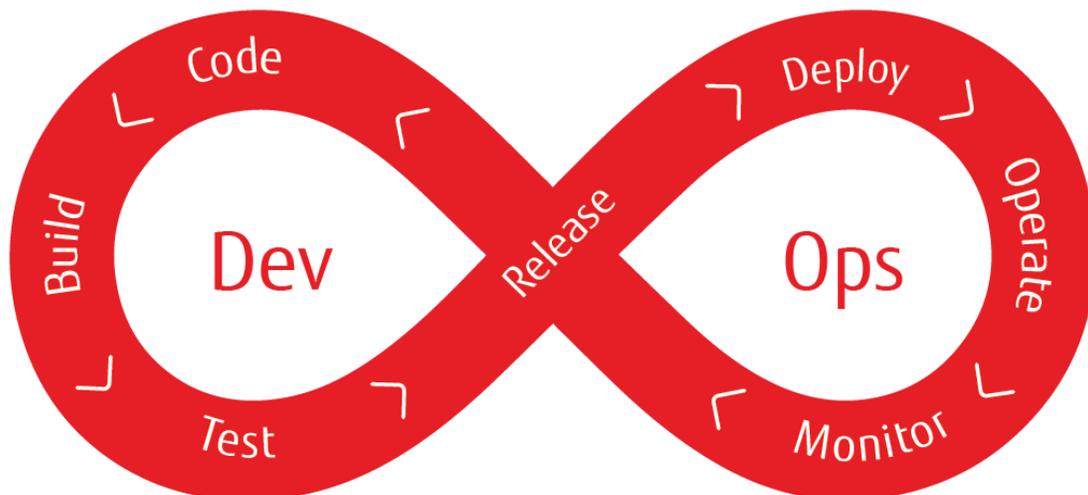
Benefits of PROGRESSION Modernization

There are numerous benefits of application modernization and the benefits are dependent on a specific set of environmental circumstances being present. Below are some of the top benefits customers have realized in the past who have engaged Fujitsu as their trusted modernization partner:

» **Improve cost efficiencies:** Legacy mainframe systems hardware and software are considered to be very expensive due to noncompetitive pricing systems prevailing due to a lack of vendors or existence on a single vendor. Moving mainframe workloads to commodity based hardware platform, Cloud computing and software eco-system drastically reduces the TCO. Application Modernization represents an approach that either reduces the costs stated in the business case, or in some cases, completely eliminates them. Because the organization owns the IP, licensing costs are minimal if not removed. Cloud and Contemporary platforms have ample vendor choices in software and hardware with a competitive pricing model, which never results in vendor locking.

» **Shortens go-to market:** Lack of frameworks, productive and advanced IDE's, debugging tools; test automation makes development activity a tedious and cumbersome process in legacy mainframe systems. Therefore, legacy systems will have high time-to-market to respond to new business needs, amendment in regulations, challenges from competitors etc. After migrating to modern technologies like .NET with highly

productive integrated development environments (IDE's) like Visual Studio, development cycles are extremely productive and short time framed. Modernized flexible IT environment is moving a step closer on aligning IT systems to dynamic business needs.

» **Mitigated Risk:** Application Modernization represents an approach that addresses much of that risk through the reduction of change. By simply moving to newer technologies while preserving the core functionality, business processes and how the end user community leverages the application changes very little, if at all. With Application Modernization "less is more", from a change perspective, and as a result, risk is significantly reduced.

» **Enables Apps for new paradigm:** With the PROGRESSION from Fujitsu automated tool suite and Application Modernization from Mainframe to .NET, modernized apps are enabled to embrace the new nexus forces of Cloud, Mobility, Containers, Analytics and Social. Cloud deployment reduces IT costs (shift from CAPEX to OPEX) and increases enterprise agility with a scalable and elastic infrastructure. Mobility can be used for increasing productivity by equipping employees to do their jobs better "on the go" and be an alternative channel to grow revenue. Analytics can enable enterprises to better understand their businesses and make informed decisions. Embracing social networks can help enterprises with evolved product design, improved customer engagement and solicit feedback.

Why Fujitsu and its PROGRESSION automated tool suite solution?

Partnering with clients to co-create a win-win is what we do. Our breadth of capability allows us to deliver what our customer's desire from a partner that brings operational and business value and shares in the accountability and ownership of the outcome. Fujitsu offer its customer a single vendor (no need for a sub-contractor for any other tool and solution) that can provide expertise and solutions to cover all areas of the modernization project:

» Automated conversion Tool (PROGRESSION owner) – Allow the flexibility of solution and tool customization

» Process and Methodology (Macroscope Owner),

» Infrastructure / Hardware

» Large System Integrator (Management, maintenance, pool of resources) In essence, Fujitsu is the partner that:

  » Is open and transparent

  » Cares about your challenges and successes

  » Is proactive and collaborate to eliminate surprises

  » Is accountable and results orientated

  » Is client-centric and easy to do business with.

Together, the Fujitsu team enjoys all the credentials and capabilities required to address the Modernization of the Legacy Mainframe System. Fujitsu is introducing a unique automated approach to Application Modernization that has been developed and refined through the combination of several projects executed over the last 15 years. In other words, we have done this before and have the references to prove our success.

The PROGRESSION solution allows for:

» **Improved Agility**

  » Moving from older technology to newer platform enabling transformation

  » Initial step towards Cloud platform, web, mobile, DevOps

  » Lower cost and risk than a rewrite

  » Functionality enhancement achieved much faster and more cost effectively using modern programming tools

» **Reduced TCO and Fast ROI**

  » By eliminating expensive legacy environments and lock-in commercial licenses we can reduce the cost of ownership and achieve faster ROI via Automated Tool conversion

» **Improved Integration**

  » Once Modernized and migrated to a new platform and technology, integration of any applications becomes much easier

» **Other Benefits**

  » Improves customer experience via web based app

  » Removes reliance on old and expensive skillsets

  » Removes dead and dying technology

  » Aids compliance and legislation

  » Simplifies the application portfolio

Written by:

Eric Payeur
CTO - Global Application Transformation
Fujitsu Distinguished Engineer, Fujitsu America, Inc.

FUJITSU

Address: 1250 East Arques Avenue

Sunnyvale, CA 94085-3470, U.S.A.

Tel: 800 831 3183 or 408 746 6000

Email: AskFujitsu@us.fujitsu.com

Website: www.fujitsu.com/us/services/public-sector/mainframe