Legacy Migration to Microsoft® .NET

The NetCOBOL for .NET Compiler

The hundreds of millions of lines of COBOL code that run on today’s mainframes are a storehouse of value. They contain business rules and workflow controls that help organizations process orders, track revenues, manage inventories, and thousands of other key business functions. Attempts to recover business logic and construct replacements for these mainframe systems have a long history of cost and schedule overruns, including many complete failures. The Fujitsu NetCOBOL for .NET compiler ensures that this history won’t be repeated on your project.

The Fujitsu NetCOBOL for .NET compiler allows you to use the same COBOL language and the same business logic that you use today. Instead of compiling object code that executes on your mainframe, code is compiled into Microsoft Intermediate Language (MSIL) for execution under control of Microsoft Windows enterprise servers in the .NET environment. Your COBOL programmers continue to work in COBOL. Your computations give you the same results they do now (something that can’t always be said if you try to redevelop your systems using Java or C++). Fujitsu’s NetCOBOL for .NET compiler fully supports ANSI standards.

But what about web services? And what about using Microsoft’s Visual Studio and other highly productive graphical development tools? Aren’t they necessary in the .NET environment? Won’t your programmers need to learn Java or C++ to take advantage of these?

No, they don’t. Using the NetCOBOL compiler, your programmers can take advantage of extensions to create web services in COBOL, and to move to Object-Oriented construction without having to toss aside their current technical skills. You can continue to maintain and develop your applications in COBOL or you can extend or enhance this legacy utilizing all of the tools and features of Visual Studio.

What Migration Problem Does the NetCOBOL for .NET Compiler Solve?

In the past, moving an application from the mainframe environment to a server environment has meant taking on the high cost and high risk of design recovery and reprogramming. The NetCOBOL compiler lets you work with the COBOL you have now—reducing the time, cost and risk of migration.
NetKicks™

One thing that will change as you move from your mainframe to .NET is your user interface. What are you going to do about the “green screens” that your users have been tied to for all these years?

Fujitsu's NetKicks software directly translates your current CICS code to create Active Server Pages that can be managed in the .NET environment. The simplest approach produces Active Server Pages with the same general format as the “green screens” they replace, but your programmers can take advantage of a wide variety of screen design tools to improve the ergonomics of your user interfaces. Pull down menus, slider bars, radio buttons and an entire compliment. The result is improved performance and greater job satisfaction for your users, along with the ability to provide a good impression for your vendors and customers as you move toward exposing functionality through web services.

NetKicks works hand-in-hand with Fujitsu’s NetCOBOL compiler, making the update of your legacy user interface a straightforward process. The required data linkages and navigational controls are maintained, reducing the risk of business disruption. You can improve the user interface as rapidly or incrementally as you wish.

NetKicks takes advantage of the similarities between CICS and ASP.NET (pseudo-conversational, transactional, stateless) to provide a straightforward migration for CICS applications to the .NET environment. This approach breathes new life into CICS applications by giving them graphical, Web-browser style, interfaces, providing access to the .NET Framework’s extensive object library, and offering the ability to use the CICS applications for Web services. At the same time it can yield significant cost savings.

The NetKicks system provides support to compile, link and execute CICS COBOL applications taking the 3270 character mode screens into GUI equivalents that operate under ASP.NET. The package includes a BMS map to ASP.NET converter, an EXEC CICS program translator and a “CICS Executive” run-time. NetKicks also supports standard 3270 BMS (Basic Mapping Service) macro functions.

What Migration Problem Does NetKicks Solve?

NetKicks enables your CICS applications to retain their existing source code, thus making the code easy to read, understand and maintain by your existing CICS developers. At the same time, it opens the translated ASP pages for extension, allowing you to upgrade your user interfaces in a controlled manner rather than forcing a major change at the time you move to the .NET environment.

zBatch™

Batch processing is not dead, but it’s been largely ignored in the rush to on-line interactive processing. Even though enterprise servers running under Windows have shown (the TPC-C benchmarks) that they have much better performance than many mainframe configurations, many organizations remain concerned about moving their batch operations to the Windows .NET environment.

Fujitsu addresses these concerns with zBatch™. zBatch enables you to port your existing MVS batch applications to the Microsoft® Windows® environment—with support for your existing JCL syntax. It is a mainframe MVS JCL executor that is designed for production use. With zBatch, JCL jobstreams are read in at execution time by an Execution Manager while datasets are maintained through Catalog and Data Services components. zBatch supports conditional job and step processing, as well as support for restart processing, Generation Data Groups (GDG’s), and temporary datasets. It includes a suite of standard MVS batch utility programs such as IEBGENER, IDCAMS, IEFBR14, and IKJEFT01. It also provides translation of standard SORT parameters into Fujitsu’s PowerBSORT sort engine. zBatch is tightly integrated with Fujitsu’s NetCOBOL® product line and it easily integrates with most 3rd party job schedulers.
JCL, PROCs and SYSIN are converted to zBatch execution libraries—text files that can be read and easily maintained in the Windows environment. Before any job is executed the JCL is scanned for correctness. Any errors are reported and execution does not start. Return codes and program failures are checked so that the appropriate branches can be taken in the JCL. zBatch provides you with the ability to spool print output, converting common MVS report formats to their Windows equivalents. Options are to:

- Output rich text format (rtf)
- Convert to html
- Convert to html and place on an ftp site
- Direct all output of a particular job class to a given printer

**What Migration Problem Does zBatch™ Solve?**

ZBatch allows you to retain the operational procedures that you rely on to complete your batch processing in a timely manner. It starts with the JCL you have now rather than forcing you to develop an entirely new set of controls, and helps to minimize the risk of operational errors when moving to the new environment.

**Microsoft Systems Architecture (MSA)**

MSA is a technology architecture for the enterprise that provides pre-tested planning and implementation guidance. The planning guidance discusses design choices for implementing information technology in ways that help formulate a standardized approach to infrastructure. The implementation guidance, which is derived from the planning guidance and based on specific requirements, documents the specific lab configurations built by Microsoft and partners to validate and prove the architecture and to ensure integration between products. This accumulated guidance can be used as a basis to formulate the Microsoft-related aspects of customer specific technology architecture.

The MSA guidance addresses fundamental infrastructure issues such as availability, security, scalability, and manageability of the platform. It also supports the IT life cycle stages of plan, build, deploy, and operate. Additionally, the guidance is designed to be used at either a component level or as a comprehensive guide to building a complete infrastructure. However it is used, MSA guidance can help jumpstart systems integration projects and lead to the following benefits for an organization:

- Reduced implementation time and cost, ensuring a faster time to benefit
- Predictable and reliable performance from pre-tested implementation
- High availability to meet service level agreements
- Security levels that meet business requirements
- Scalability to meet projected business volumes
- Reduced implementation and operation risks

Fujitsu has been certified by Microsoft as a vendor of enterprise data center solutions that comply with the guidelines of the MSA program.

**What Migration Problem Does Microsoft Systems Architecture Solve?**

Microsoft Systems Architecture ensures that the .NET technology environment you are moving to will be optimized in terms of the number, variety and configuration of the components that are used. This minimizes cost, shortens the planning cycle and allows pre-installation benchmarking for performance.

**Application Value Assessment**

What's the business proposition for the legacy migration you're considering? In order to help you answer this question, Fujitsu Consulting has developed a framework of best practices for Application Value Assessment. The practices in this framework take a hard look at the alignment of the application portfolio with the business strategies, technical direction, market direction, spend strategies, etc. They also focus on identifying where an organization may be at risk; in the case of legacy migration, these would likely include dependence on expensive skill sets or legacy technologies that may not be able to respond quickly to market changes.
Application Value Assessment practices and tools provide an objective, “value-based” analysis that clearly identifies areas where action should be taken. They enable “what if” analyses to determine the best return and evaluate alternative actions to balance the portfolio. The payback is immediate, high-ROI guidance on how to prioritize applications in the portfolio, leading to the following results:

- Identification of the true value and contribution of applications.
- Reduction in the overall cost of supporting the current portfolio of applications and identification of how total cost of ownership can be better managed.
- Re-direction of portfolio savings and resources to strategic business applications and new strategic initiatives that better support the business strategy.
- Creation of a sustainable end-to-end process and governance structure, from the initial investment decision through to application decommissioning.

Application Value Assessment can use the industry-leading ProSight™ tools to provide clear graphic representations of the business value of any proposed legacy migration. ProSight also provides the means of tracking the projected business benefits of the migration to ensure that the organization receives the full value for its actions.

What Migration Problem Does Application Value Assessment Solve?

Application Value Assessment provides a proven method and toolset for evaluating the costs, risks and business impacts of legacy migration. This information is invaluable in building the business case, and in communicating the business value of the migration to the organization’s executives and other affected groups.

Bringing It All Together

Fujitsu and Microsoft have jointly developed a repeatable process for successful legacy migration.

![Figure 1. Legacy Migration Steps, Tools and Support Services](image-url)
The Fujitsu/Microsoft process consists of six steps, each of which builds on the previous step.

**Planning & Assessment** - Evaluation of a proposed migration. Building the initial business case. Assessing the business and technical impacts in a “what if” modeling process. Understanding the business value of the current and target environments. This step is where Application Value Assessment provides an objective analysis of the Legacy Migration project and lays the foundation for success.

**Migration Workshop** - Presents the target environment and the target business objectives. Familiarizes the organization with the capabilities of .NET and gathers additional information for the business case. The Microsoft Systems Architecture is used as a basis for the technical discussions.

**Migration Roadmap** - Lays out in detail the executable steps of the migration, including all dependencies. Provides the full ROI/TCO analysis for the business case. Prepares the migration budget and schedule.

**Proof of Concept (Optional)** - A portion of the environment is selected to demonstrate the capabilities of the migration tools and the target .NET environment. This may take place in a lab setting (a Microsoft or Fujitsu development center) and it does not apply the full set of project controls as will be present in the actual migration.

**Migrate** - The legacy code and data is migrated to the .NET environment. It is tested and documented. Desired changes to the user interface are made and any required data restructuring (for a hierarchical to a relational database, for example) is performed. Extensive testing verifies that the migration is correct and the migrated system is brought into production. The Fujitsu migration tools (NetCOBOL, WinKicks and zBatch) are at the heart of this process, and the Microsoft Systems Architecture is used to optimize the technical environment.

**Legacy Retirement** - The legacy system is retired from service. For some legacy systems, this may be a lengthy process and Fujitsu can provide Managed Services support to allow the IT staff to focus on the .NET environment. Application Value Assessment is used at this point to validate that the benefits that were projected for the Legacy Migration project have been delivered.

**Fujitsu and Microsoft**

Fujitsu and Microsoft are global alliance partners with the depth of expertise, breadth of resources, and commitment to make sure your legacy migration is successful.

Together, Fujitsu and Microsoft offer:
- **A full suite of legacy migration resources.** Value management and migration methodologies are packaged into a single offering that provides a complete roadmap and ROI for moving customers away from legacy mainframe environments to Microsoft .NET platforms.
- **A dedicated .NET Practice Group.** This group within Fujitsu Consulting is focused on competency around Microsoft Solution Components and drives training and awareness throughout Fujitsu Consulting.
- **Industry Experience.** Fujitsu Consulting has depth in Industry verticals and Microsoft's superior technology to create end-to-end value propositions that solve industry-specific business problems.

**Advantages to Your Organization**

The advantages of the global alliance between Fujitsu/Fujitsu Consulting and Microsoft are as follows:
- Fujitsu tools (NetCOBOL, NetKicks and zBatch) provide the fastest route to the lowest-cost environment.
- Fujitsu's COBOL approach preserves the investment in business logic and staff skills. There's no need to mount a major training and development effort before seeing benefits.
- Fujitsu's top-rated methods clearly identify and mitigate the risks associated with migration and manage migration complexity to deliver on-time and on-budget.
- Staff productivity using advanced tools such as Microsoft’s VisualStudio can be increased by an order of magnitude over current practices utilizing classic mainframe development tools.
- By moving to standards-based mechanisms like Web Services and XML the cost and complexity of establishing interoperability are reduced significantly. This is increasingly important to clients who are trying to streamline their supply chains and integrate multiple lines of business.
- Fujitsu’s Legacy Migration approach is value focused, not technology focused. We apply industry-best Value Management tools to select the migration path with the highest value to our clients. We then apply our Benefits Realization methods to ensure that the full business value of migration is harvested.
- The Microsoft Windows environment offers incremental scalability to deal with business growth, allowing focused, cost-effective configuration tuning to speed batch processing and improve user response.

Success Stories

California City School District

The Problem
- Significant portion of total IT spend on maintenance of existing environment
- Time consuming, expensive development platform
- Looking for a less costly solution

Legacy Environment
- Amdahl 5890 Mainframe, 4500 Users
- 19,000 JCL Jobstreams
- 2,300 Batch Programs, 4 Million Lines of Code
- 500 CICS Programs
- 1M Lines of Code
- 10,000 Data Files

New Environment
- Database Servers
  - 2 Quad Xeon 500s Production
  - 2 Quad Xeon 500s Failover
- Production Servers
  - 2 Quad PIII 500s Batch Servers
  - 2 Dual P1-133s Online Job Submission, Batch Scheduling

Result
- Overall processing time reduced significantly
- Batch program execution 30% faster
- Extension and enhancement of legacy COBOL and CICS code
- Significant cost reductions for hardware, software and operations and development

“This was a project that some people said couldn’t be done... We were able to leverage our initial investment in COBOL into a cost effective, efficient system that can serve us well into the 21st century.”

- Paul Gustafson, Systems Development Coordinator
California County Court System

The Problem
- Poor response times during peak operation of case management application
- Chargeback costs escalating +$60,000/month
- Initial migration effort to J2EE failed due to lack of scalability

Legacy Environment
- IBM ES9000
- OS 390
- COBOL and CICS - Case Management Application

New Environment
- Dell PowerEdge 2550 Dual PIII 1.1GHZ
- Dell PowerEdge 4500 Dual Xeon 900MHZ

Result
- Dramatic reduction in staff costs
- Systems costs reduced from $720k annually to $20k total
- Maintained transactional integrity and improved performance

“By porting the application to NETCOBOL we improved the performance and maintained the transactional integrity of the original application. Our costs are now a fraction of what they were before.”

- IT Manager

Experience the Fujitsu Consulting Difference

As the management- and technology-consulting arm of the US$45-billion Fujitsu group, Fujitsu Consulting integrates the core expertise of Fujitsu companies and its partners to deliver complete solutions to businesses and government in the areas of Information Management, Legacy Modernization and Managed Services. The scope of these offerings extends from strategic management consulting to the tiniest detail of infrastructure operations. Through its industry-recognized strategic methodology, Macroscope®, Fujitsu Consulting assists clients in incorporating more value into their investments and driving their leadership in the marketplace.

We work with you to create solutions and produce results that drive your business.