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## White Paper

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### Technical and strategic impetus for migrating from ICL mainframes to Windows based systems

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*As the deadline for the obsolescence of the ICL mainframe hardware approaches, several large organizations are saddled with the decision of what to do with their resident ICL infrastructure. In many instances, organizations are employing their ICL mainframes(s) to manage their back-office and/or run mission-critical applications. These (largely) custom applications often represent decades of investment in the legacy infrastructure. Moving to a new system amounts to a write-down of investment in the current systems in addition to the cost and pain of deploying and adapting to a new environment. OpenSCL offers a seamless alternative by allowing the ICL applications to be migrated to a Windows client-server environment, without any code changes or front-end changes for the end-users. Capitalizing on the power and functionality of the Windows operating system can then further enhance these applications.*

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## INTRODUCTION

A number of organizations have made huge investments, over a number of years, into mainframe systems and technology. These systems run a variety of mission-critical, back-office and transaction-intensive applications and host large databases of information. Over the years, there has been a steady and continuing migration of these systems into more mainstream and less expensive technology. Still, however, a large number of organizations continue to use mainframe platforms – estimated at an installed base of 35,000 to 40,000 machines worldwide<sup>1</sup>. By some estimates, mainframes and mini computers process 75% of all business data with 175-200 billion lines of code<sup>2</sup>.

In a market dominated by IBM with an approximated 85% market share, ICL mainframes represent an installed base of roughly 2,000 machines, the majority of which are employed by government and public-sector (or formerly public sector) organizations in the United Kingdom<sup>3</sup>.

ICL, once the leader in British information technology, fell upon hard times with the advent of desktop and client-server computing. Fujitsu Services, part of the Tokyo-based conglomerate, acquired ICL in the early 1990's and has since made several public pronouncements about ceasing further innovation and hardware support for all ICL hardware platforms, as early as 2010. This has caused current ICL users to focus on their strategic and technical options.

## OPTIONS FOR ICL USERS

Organizations employing ICL mainframes generally have four (4)

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<sup>1</sup> Source: EBE Computing analysis; marketing reports

<sup>2</sup> Source: Gartner Group

<sup>3</sup> Source: EBE Computing analysis; industry reports

options available to them to replace the obsolete ICL infrastructure:

**A. Upgrade to a higher-generation mainframe:** As support for ICL hardware is being discontinued in a phased manner, some organizations with older generation mainframes (such as the Series 39, SX and DX-class machines), may choose to upgrade to a newer generation mainframe; this buys the organization more time to address its dependence on the ICL infrastructure; however, this option is often expensive and, at best, a stopgap measure.

**B. Deploy a new enterprise environment:** The back-office or mission-critical applications running on the mainframe can often be addressed by deploying a new enterprise management system, such as SAP or Oracle. While the ICL back-office may have a limited shelf life, it has often served the organization competently through decades and is completely customized to their requirements. Sometimes, organizations choose to replace the ICL mainframe infrastructure with an enterprise resource planning (ERP) system; such changes are often beset with pitfalls, including:

- *Large capital outlay:* ERP deployments attract significant capital investment. For a large European utility with over 30,000 employees, such an investment could easily top €100 million. As a rule, this expenditure would represent a significant increase over the current IT spend of the organization and be typically justified in terms of intangible benefits of greater efficiency and productivity
- *Time lag:* According to a survey conducted in the US, a typical ERP implementation takes almost two

years to complete<sup>4</sup>. The decision to go in this direction also invites a significant time lag owing to the cost involved. In addition, ERP projects are often characterized by the risk of time and cost overruns, thereby jeopardizing the in-time availability of a replacement system for ICL backend before hardware obsolescence sets in

- *Large-scale change management:* A significant element of large ERP implementations is a business process re-engineering initiative, requiring the organization to rework the manner in which it operates. Such an exercise requires massive change initiatives, which often accompany painful organizational restructuring exercises. Furthermore, most ERP implementations do not take into account the nuances of the business and are often criticized for a “one size fits all” approach<sup>5</sup>
- *Legacy data transfer:* The data in ICL mainframes is often stored in proprietary network databases or flat file structures; these data need to be reliably converted to a relational format for use in the ERP system, entailing a non-trivial and technically complex exercise

**C. Rewrite of applications:** Organizations are often tempted to rewrite their reliable ICL applications for use on newer, more mainstream platforms. Such projects are often destined for failure due to the following reasons:

- *Lack of expertise:* A rewrite requires resources that understand the source mainframe platform, the target platform and the business logic. Such cross-functional resources are rare.
- *Project risk:* The peculiarities of the low-level system and data functions

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<sup>4</sup> “Survey: ERP costs more than measurable ROI”, Computer World, April 5, 1999

<sup>5</sup> Mahadevan, B, “The ERP Conundrum”

on the ICL mainframe platform are difficult to replicate on the target platform, often raising inconsistencies in the behavior of the two platforms. This creates confusion and, at best, retraining requirements for the users.

Furthermore, according to the Software Engineering Institute, the average programmer introduces four (4) errors or “bugs” for every 100 lines of new code development. For a one million-line rewrite effort, this translates into 40,000 bugs in the new system, which can take years of testing to uncover and resolve!

- *Other issues:* A rewrite effort is similarly plagued by issues of legacy data transfer and time lag as an ERP implementation, and is usually not a recommended route for the organization.

**D. OpenSCL migration:** An OpenSCL-based migration offers a seamless path for ICL users to continue reaping the benefits of their legacy investment, albeit on a more open and extensive environment such as Windows<sup>6</sup>. With OpenSCL, the applications are recompiled for the native platform and the mainframe-specific functionality emulated on the Windows platform. The economics of the migration usually result in significant savings for the organization over using the mainframe platform, and offers a way to extend the application through a new user interface, reporting tools and other third-party utilities and functions available for Windows.

OpenSCL allows the obviation of the ICL mainframe platform from the enterprise. The objective of any OpenSCL migration is the replacement of the mainframe by a Windows server.

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<sup>6</sup> The OpenSCL platform is also available for IBM’s AIX UNIX platform although over 90% of the migrations are to the Microsoft Windows platform

## OPENSCL: TECHNICAL OVERVIEW

Visual OpenSCL, or OpenSCL, now in its fourth major product development iteration (version 4.4), is based on a familiar open systems scripting language called SCL that is widely employed to maintain and operate server and mainframe computing environments around the world. OpenSCL effectively emulates the ICL mainframe VME operating system on the Windows platform.

OpenSCL is engineered with a sophisticated underpinning of compilers and interpreters. The language used for the application code for the mainframe is COBOL and is recompiled using MicroFocus NetExpress<sup>7</sup> under the Windows environment

Mainframe commands are converted into native machine instructions thereby allowing different operating systems to seamlessly run on the same computer or network. OpenSCL runs on the Windows operating system like any other regular application, with its complement of an .EXE and several DLLs. The OpenSCL system hosts the recompiled ICL mainframe applications that are running under Windows to provide mainframe-specific services on the new platform.

OpenSCL is engineered in two versions: enterprise and developer. The enterprise version of the product contains a sophisticated "Batch Scheduler" that coordinates processes that run in unattended mode across the entire enterprise. It always has an "Output Scheduler" to coordinate printing between the application and the Windows Print Manager. The Enterprise version also includes an "Operating

<sup>7</sup> MicroFocus and NetExpress are registered trademarks of MicroFocus plc, which provides one of the most widely used COBOL compilers in the industry

Station" (or "Oper"), which enables communication between an operator and development users as well as communication between an operator and the SCL running jobs in unattended (batch) mode. The developer version of the application consists of a fully functional, interactive facility for developing scripts and applications (written in either COBOL or C/C++) and provides a common look-and-feel for support professionals and developers across the enterprise.

### Technical Benefits

There are certain key benefits that the end-users derive from the OpenSCL environment:

- The OpenSCL system optimizes mainframe code to the native machine environment on which it is running. Experience suggests that in an average migration, batch processing speeds are enhanced by at least 40% whereas terminal access appreciates by 10%
- For the benefit of the developers, there is a fully functional integrated development environment (IDE)

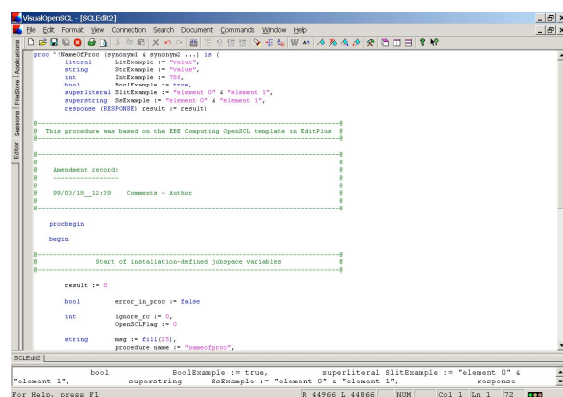


Figure 1: OpenSCL IDE

that includes an editor -- with features such as syntax coloring, advance search and replace, bookmarking, case migration, automatic brace matching -- that increases the efficiency of the migration and any post-migration development effort

- The development environment comes ready with templates that can be called up through shortcuts. There is also an auto-complete feature
- Synonyms can be set for commands in the OpenSCL environment
- OpenSCL has full context-sensitive help features
- Anti-piracy protection is built into the software that makes it difficult to run pirated copies of OpenSCL without an encrypted password

In addition, one of the key benefits of migrating to the Windows environment has to do with the ability to quickly and significantly enhance the base application by taking advantage of built-in Windows functionality or interface with third-party applications. Experience suggests that once an ICL mainframe application has been migrated to the Windows environment, clients often opt for enhancements. Common improvements include replacing the character-based “green screen” front-end by a rich graphical-user interface; a data warehousing or mining function to exploit the data now available in a relational database (most commonly Microsoft SQL); and interfacing with communications facilities such as a web publishing or an SMS notification engine.

#### Common Misconceptions

The reasons that users often cite in favor of using the mainframe environment over a Windows-based server often revolve around speed, reliability, and security. Practical experience suggests that these are myths that can be easily debunked by pointing to practical experience and recent advances:

- *Speed:* The installed base of ICL mainframes, on average, represent technology that is several years old. Advances in server technology allow less expensive and faster alternatives to a mainframe (in fact, ICL even mainframes now employ cheaper

SCSI hard drives as used in mainstream servers). Recent experience suggests that a 2 Ghz dual-processor Wintel server with 4GB of onboard RAM, running OpenSCL, can perform identical processing at twice the speed of a 16-MIPS DX-class ICL mainframe<sup>8</sup>

- *Reliability:* Often an argument cited in favor of mainframes, the claims of greater reliability fall short on closer examination. Arguably, the best benchmark of reliability is gauging the use of client-server technology in mission-critical environments. The fact that the NASDAQ capital markets are entirely underpinned by a Wintel infrastructure speaks volumes for the reliability of the Windows environment. Concerned clients can always avail themselves of high-availability Windows configurations that offer exponential-grade reliability
- *Security:* The OpenSCL system preserves the security protocols of the source platform while adding the benefits offered by the Windows NTFS access control model. Any passwords local to the OpenSCL system are stored in a secure database using hash-type non-reversible encryption. Organizations that migrate to the Windows-based OpenSCL platform can be assured that their data and information are as secure as in the mainframe environment

#### Technical Roadmap

The OpenSCL system is written in platform independent SCL and Microsoft Visual C++, using Visual Studio 6. The system lends itself, architecturally and logically, to extend its functionality to the .NET platform. The next version of the system, slated for beta version by end of 2004, will take advantage of the power of the .NET technology.

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<sup>8</sup> EBE Computing analysis

## ECONOMIC AND OTHER BENEFITS

A typical mainframe lease costs can cost anywhere between €0.5 million and €5 million a year. This figure excludes the costs that are integral to the maintenance of the mainframe infrastructure that typically attracts a fair complement of in-house programmers, data clerks, operators or other support personnel.

A migrated environment offers immediate cost savings in terms of hardware – the migrated server platform often costs a fraction of the mainframe lease. These savings are magnified when one takes into account the total cost of ownership of the mainframe compared to a Windows server.

Clients also find that the usability and ease-of-use of the erstwhile mainframe in the Windows environment leads to a second-order effect where support requirements for the environment are considerably less. Typically, most organizations have an installed base of Windows servers and desktops and routine maintenance tasks, such as backups and end-user support for the migrated environment, can be easily absorbed into the incumbent infrastructure.

Another issue that plagues the mainframe market is a reliance on the dwindling base of ICL support professionals. As mainframe sales – and specifically ICL mainframe sales – have been on a declining trajectory for a considerable period now, new information technology professionals are more attracted to newer desktop or server markets than to mainframes. Consequently, the base of professionals servicing mainframes has been declining, causing headaches for organizations with an installed mainframe infrastructure. Standardized support processes, in of themselves, are

a considerable intangible benefit to be derived from a migration to Windows.

Finally, the productivity gains for an organization from introducing enhancements to a migrated environment are an intangible benefit that adds to the return that can be realized from a mainframe-to-Windows environment.

## CONCLUSION

According to recent research, integration with legacy infrastructure was the key concern for CIOs in 2003<sup>9</sup>. In terms of the ICL mainframes, OpenSCL offers an economic and elegant solution that allows the organizations to harvest their long-standing software and development investment in their legacy infrastructure, while taking advantage of the power and functionality that Windows offers in an enterprise environment. OpenSCL is also the logical solution to address the near-term issue posed by the obsolescence of ICL hardware.

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### Notes:

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<sup>9</sup> Source: Gartner Group