



Illustratus

Research

*New project platform
selection for CICS users*

*How to decide whether to implement
new requirements on CICS or
elsewhere*

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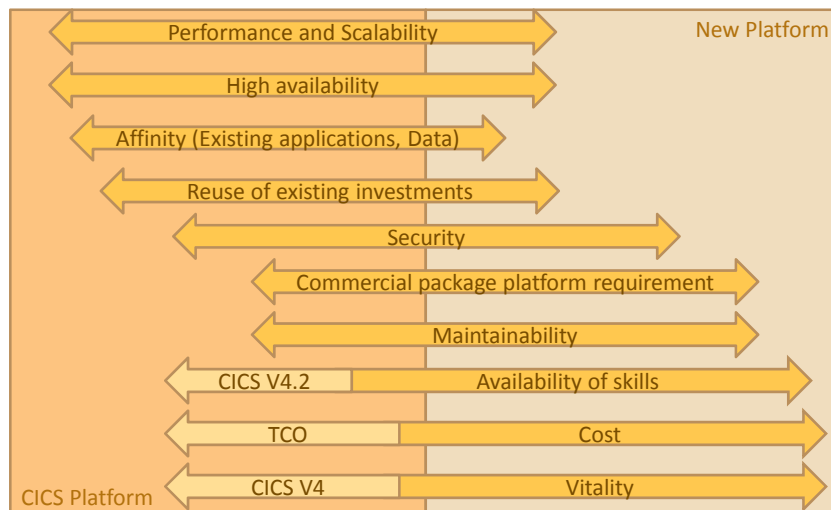
Executive Summary

CICS Transaction Server for z/OS is IBM's premier transaction processing platform for handling mainframe-based online business workloads, and almost all large companies have major swathes of their key corporate applications based on it. However, there are many more options for addressing new business requirements today than there were in CICS's early days. Consequently, as companies look to embrace new opportunities, decisions must be taken on where to house these new workloads. Should new CICS applications be built? Perhaps CICS applications should form part of the new workload, driven through some sort of service-oriented architecture from other platforms. Or maybe the new work should be built in an entirely separate environment, either sharing data through some sort of remote access capability or a data warehouse.

These are decisions that will be familiar to most CICS users, and it is not easy to take all the various conflicting factors into account to make the right choices. A few do not have to worry about this tricky selection process because the decision has already been taken at a senior level. Some companies have a strategic imperative in place not to increase the mainframe workload in any way, while others have decided to maximize their extensive CICS investments by making CICS the preferred platform for new and updated business applications. However, the majority of CICS users will find themselves faced with working through the platform selection decision minefield, trying to address multiple different needs in the optimal way.

The purpose of this report is to provide some independent guidance to ease this process. After in-depth discussions with a range of different CICS users across the world, Lustratus has gathered together some of the most common platform selection criteria employed by users today. Of course, not all will be relevant to every company going through this decision process, but the complete list should provide a useful checklist. As might be expected, some of the influencing factors seem to push the decision away from CICS, while others favour CICS as the best choice for new business application workloads. The diagram below summarizes some of the key factors that will be discussed further, and an idea of the extent to which these factors are likely to influence the decision one way or the other.

PLATFORM SELECTION FACTORS



Source: Lustratus

Figure 3: Influencing factors on platform choice for new business application projects

Introduction

Companies across the world have been using IBM's CICS transaction processing system as a platform for their mainframe application workloads for over forty years, and in that time literally trillions of lines of CICS application code have been written and deployed to become the cornerstones of online operations. Indeed, IBM has said that virtually all of its mainframe customers have CICS installed. But IT has moved a long way since the early days of mainframes, when the main choice was whether to use CICS or IMS. Now there is a wide array of hardware and software environments available for selection, each with their own advantages and drawbacks. On top of this, the different factions can be passionate to the point of fanaticism; the mainframe organization will swear that mainframe CICS is the only viable choice for new business applications, the Microsoft team will argue just as strongly for .NET and Windows and the UNIX world will explain how Linux is where modern IT belongs. Meanwhile, the internet-based evangelists will be pushing a different agenda entirely.

This leaves many architecture and management teams with the unenviable task of having to make the platform selection decision for new projects in the face of intense, highly partisan pressures. These platform selection decisions will end up staying with the company for many years, and therefore it is imperative to try to make the best decision both for today and the future. But unfortunately, these important decisions often end up being based on whichever faction shouts the loudest.

This paper is designed to help CICS users with the platform selection process for new business application projects. It does not attempt to recommend a specific answer, but instead highlights the key elements and factors in the decision-making process.

Methodology

In order to come up with the best possible picture of the key decision factors, Lustratus carried out a range of in-depth interviews with existing users of CICS Transaction Server for z/OS across the world to find out what factors they use when deciding whether to host new developments on CICS or elsewhere. The Lustratus approach is not to engage a third-party market research team to acquire market intelligence, but rather to take a much more qualitative approach by talking directly with company management and executives. The reason is that typical market research is script-driven, and often the interviewer has little or no knowledge of the subject. As a result a lot of added value is lost from the interview. Through direct interviews, Lustratus can ensure that associated points brought up by the interviewees which may lie outside of a typical script are captured and followed up. In addition, since every interview is anonymous, companies are generally a lot more forthcoming with their views than they might have been if their words and views were attributed.

The decision factors discussed throughout this report are an amalgamation of the input gathered by Lustratus throughout these interviews. Some of these factors may not be relevant to particular users; instead, the list should be used as a 'checklist' of possible factors to be taken into account in order to ensure the best platform selection decision.

The three CICS user segments

The first observation coming out of the Lustratus research efforts is that, as far as the objective of this particular report is concerned, there are primarily three segments of CICS customers covered by the responses.

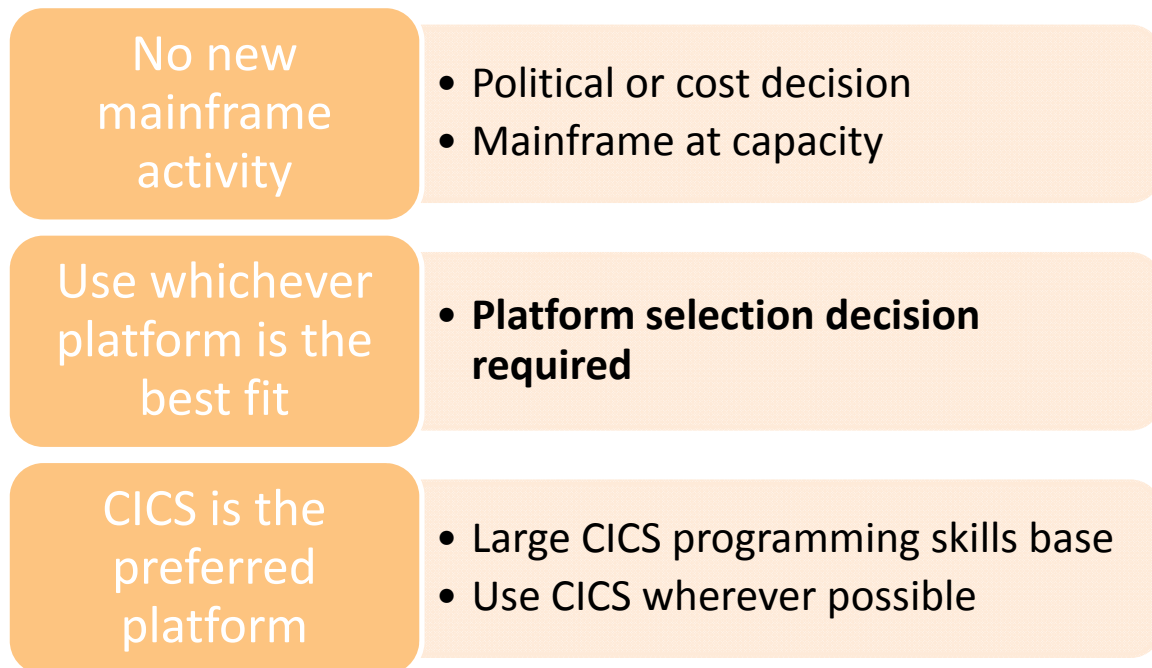


Figure 2: The three segments of CICS users based on new project platform selection freedom

Some CICS users stated quite categorically that there was no prospect of any new developments on CICS. Typically, companies in this segment were operating under a corporate directive to avoid any new work for the mainframe, and anything other than maintaining existing CICS applications was completely out of the question. Reasons for this position varied from a corporate focus on avoiding any further mainframe upgrades to a strategic intention to move off the mainframe. Having said that, companies who did have this latter objective stated that this was usually more of a 'political' decision rather than a logical one.

Another group of users were operating with a clear position of CICS being the preferred platform for new or updated business applications. These companies were typically heavily invested in CICS, with a large and well-trained CICS skill base. In addition, they usually had stringent business requirements in areas such as availability and performance.

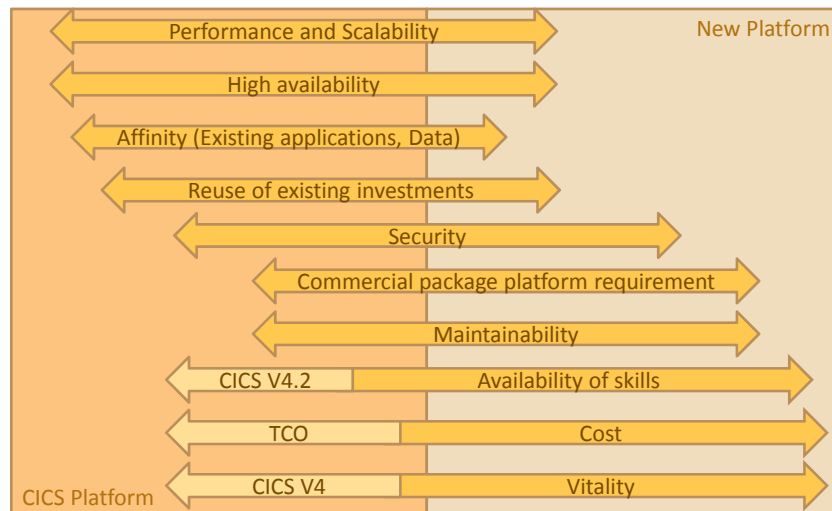
However, it is the middle segment of respondents in the diagram above that form the key research pool for this paper. These are companies with CICS systems in production, but with a relatively free choice over where to house new developments. Rather than having any platform edict, these companies focus instead on trying to choose the most appropriate platform for new work based on the business requirements and constraints of the project.

Decision factors for/against CICS

As stated earlier, the key research for this report is based on the experiences of those CICS users who have a relatively free decision to make on platform selection for new business projects and developments. As one might imagine, each company interviewed had a different set of criteria and placed different weights on each factor. However looking across all the companies interviewed, it is possible to gather a reasonably complete list of the major factors involved. This provides a 'checklist' for companies faced with similar decisions to speed up

the decision making process and perhaps also lead to the optimal platform selection. The diagram below summarizes these key decision factors and whether they tend to push the decision more towards the CICS platform or not.

PLATFORM SELECTION FACTORS



Source: Lustratus

Figure 3: Influencing factors on platform choice for new business application projects

The scope of the arrows for each factor reflects the extent to which the factor will tend to push the decision towards using CICS for the new project, or some other platform. The extensions to the last three factors show how common perception of some factors may need to be modified, either because of new developments in CICS over the last few years, or in the case of “Cost” because of a tendency to look at cost purely in software license terms rather than in terms of total cost of ownership (TCO).

Each one of these areas will now be discussed in more detail.

Performance / Scalability

When CICS was born, there was nothing to match the IBM mainframe as a platform for high-performing commercial applications. Over the years, other viable platforms have emerged, and technology advances have seen these platforms improve year-on-year in terms of performance. The Unix/Linux operating system platforms have become high-performing systems in their own right, while grid computing techniques have made it possible to deliver substantial amounts of processing power by linking together banks of Windows-based PCs. Advanced, multi-core architecture, Intel-based processors have offered another route to increased performance, and more recently Cloud Computing has offered yet another way of accessing increased processor power.

However, although one or two respondents did say that they believed high performance / throughput requirements were no longer a deciding factor for choosing to place new projects on mainframe CICS, the majority of companies said that if they had to address a new business application requirement with strong performance specifications, this would give a high weighting to choosing CICS.

The key point emerging after further discussions with respondents was that the type of workload was particularly relevant. The example of Cloud Computing shows this up starkly; most people would acknowledge

that compute-heavy calculations can often be performed very efficiently using various Cloud Computing services, but as soon as a workload requires lots of access to corporate data then the Cloud platform becomes far less attractive. The important factor in favour of CICS in the area of performance is that it is designed to run typical commercial workloads that have thousands of simultaneously active online users, considerable levels of data access and a need for predictable response times. If a new project is one that is mostly focused around complex algorithmic trading calculations and zero-latency communications, for example, then a specialist platform might be more appropriate, but for general commercial activities the CICS/mainframe combination will meet the most stringent performance needs. CICS is also used to handling a much wider spread of differing classes of service, with prioritization and workload balancing facilities that can be used to cope with the demands of a mixed workload.

On scalability, one company brought up a very interesting aspect of CICS scalability support. The interviewee explained that the company had to operate for long periods without down-time, and specifically called out the fact that CICS was better than the other platforms the company uses at 'garbage clean-up'. This avoided the system gradually becoming degraded over time due to wasted resources such as storage and memory.

There was one interesting development that did throw into question the importance of this area in the decision making process however. More than one company interviewed commented on a gradual shift in user expectation. For a long time, users of mainframe CICS expected sub-second response times, even in periods of heavy load. But over time, experiences with workstations and server platforms, whether personal or business-related, are shifting the cultural expectation of 'acceptable' service to the point that users become resigned to 3-4 second response times and assume it is the norm. In companies where this shift has occurred, arguments about scalability and performance tend to be less relevant; users give up complaining, although of course the impact to business operations may still be major.

High availability

Demands for very high availability often result in similar arguments to those for performance and scalability discussed above. While it is true that many non-mainframe platforms have come a long way in providing clustering support and hardware and software redundancy, most respondents agreed that where there are particularly stringent high availability needs, for example five 9s or higher, especially when required in a 24 by 7 operation, this placed a lot of weight on an eventual mainframe decision. One securities trading company explained that it had to maintain significant database stores while at the same time providing 24 by 7 support, and it was therefore essential that it was possible to reorganize databases to maintain efficient access without causing any service disruption. Another large insurance company had done a lot of work to implement a full standby and disaster recovery solution based around Sysplexes, to ensure that even in the event of a fairly major outage the company could continue servicing its customers. This company made the specific point that globalization has introduced a wide range of competitors just waiting for the leading suppliers to miss a step.

However, again the decision must take into account the type of workload being considered. A medium-sized retail organization reported that it had implemented a highly available system based on clustered services which was quite adequate for its needs, although in this case these systems were supporting stores in only one time zone and as such there was an overnight window for maintenance activities every night.

Affinity

One of the most powerful decision factors that governed a final choice for CICS was affinity; that is, affinity to existing CICS applications, or affinity to data 'managed' by CICS. There were a number of sub-factors that came up in discussions about affinity, such as the impact of affinity on cost, performance, integrity and scalability.

Dealing with application affinity first, it was pretty much accepted among the interviewees that a critical factor in deciding to carry out the new work in CICS was whether the functionality was basically an extension of existing

CICS application capabilities, or was new functionality that could be considered independently. A number of companies had adopted some sort of service-oriented architecture (SOA) approach, where CICS capabilities were exposed as services to external consumers, but there was general concern that if CICS application functionality needed to be extended, it would be faster and cheaper to simply build a CICS-based extension rather than to create a new set of CICS services and then utilize those from an off-platform application.

To be fair, there were views on both sides of this position. One bank explained that a new project they had just delivered into production needed to interact with a whole range of existing CICS applications, and since performance and security were also big issues then the complexity of building a non-CICS solution and driving the CICS applications either through web services or via an MQ communications pipe was too much of a risk, as well as requiring a lot of extra work to 'service-enable' the target CICS applications. However another financial services company said that they had already created a pool of shared web services for key CICS application functionality, and since the new project did not require anything extra from CICS then affinity was not an issue.

Data affinity tended to be a more heavily weighted factor. Top of the list were companies with extensive or critical corporate data stored in VSAM files. A number of respondents quoted reliance on VSAM files as the major influencing factor in choosing CICS for new projects. While Extract/Transform/Load (ETL) solutions can be used to get around the issue to an extent, this is completely unable to cope with high volume, real-time, interactive access to the data. It appears that if a lot of VSAM activity is involved, then the risk of going with a non-CICS solution in terms of integrity, performance and security is generally considered to be unacceptable.

The same seemed to be true with IMS data. Again, the feeling was it was safer to continue using CICS to access the IMS data rather than try for some sort of data staging or remote access approach. Interestingly, DB2 data was not regarded in the same light at all. A number of companies said that they would not have a problem using DB2 databases in parallel with CICS, because they were more confident the data sharing could be handled without any problems.

Reuse

An important factor for many companies interviewed in deciding where to host new work was the desire to reuse existing investments. This may sound odd in the context of choosing a platform for a new project, but whether the new project has new code written for the CICS environment or not, if it is reusing CICS applications then it is still increasing the CICS workload size and therefore has a similar effect.

Over 75% of companies interviewed had implemented some sort of mechanism for driving existing CICS applications from non-CICS systems. Some had done this themselves – one large financial services company, for instance, had written its own middleware based on an MQ network, where work was placed onto various queues and picked up by CICS to be executed. However the majority were making CICS transactions available as consumable web services, either using the built-in CICS support or other third party mainframe integration tools. One pharmaceutical company specifically called out the fact that although there was a management edict in place to avoid writing new CICS COBOL code, development teams were encouraged to use existing CICS applications where possible through web services support. The aim was to keep costs down and maintain service quality through reuse.

Security

This area was a bit of a surprise. Before the interviews, Lustratus had expected this to be an area that delivered quite a lot of weight to the selection of a CICS solution, but in fact most respondents did not see this as a particularly major factor. The view seemed to be that security in non-mainframe environments has come a long way, and is now on a par with that found in the mainframe environment. More relevant than actual technical capabilities, however, was to what extent different security solutions could work together. The general feeling was that whatever solution was adopted, it must be able to interoperate with the existing mainframe security

implementation, whether RACF, Top Secret or some other third party offering. This was a reflection of the fact that all the companies interviewed currently run a large part of their mission-critical back office applications on CICS, and therefore it was imperative to ensure that any new solution did not compromise this security domain.

Commercial package requirements

The companies interviewed were reasonably equally split between those that were wedded to a 'buy not build' philosophy and the others that were open to either approach, or perhaps even leant towards the build option. However, for companies with a strategic direction of buying in software, this was by far and away the biggest factor in deciding platform selection for new projects. For example, one telco company went with a non-CICS solution purely because it could not find a CICS-based package that would achieve the functionality it needed.

From the responses, it appears that there is a general feeling that this is going to become a bigger and bigger issue for CICS users. The perception was that most new package development is happening off the mainframe, and that as the vitality of the CICS-based commercial package inventory is reduced, this will force more companies to build new solutions in non-CICS environments. However this was certainly not the case for all users. In the Asia-Pacific region, for instance, a number of companies listed the fact that the packages they wanted were CICS-based as an important factor in selecting CICS.

Maintainability

Although only brought up by one or two interviewees, the subject of application maintainability deserves a mention. To illustrate the issue, one bank explained that some of their core CICS applications were now many years old and had been modified literally hundreds of times over the years. The interviewee said that concern was growing that perhaps some of the applications were coming to the point where the cost of maintaining them and ensuring continued quality of service was becoming unacceptable. The specific phrase the interviewee used was that there was a concern over 'end of life' for some applications.

It appears that this growing brittleness of heavily modified applications can become a factor in the platform selection decision. The same bank said that this was the key reason it was looking for a replacement option for its core banking application. That particular company was looking at bringing in a commercial package instead, which would probably not be CICS based.

On the other hand, the mainframe-based maintenance support is generally reckoned to be more rigorous than that frequently offered on distributed systems. For instance, one company specifically called out the fact that when urgent 'hot fixes' were required, these could be applied much more quickly in the mainframe environment than on the distributed platforms, partly because of the centralized nature of the mainframe but also partly because of the superior level of fix management and support.

This last point also bears on the discussion about build vs buy and commercial packages. One interviewee explained that an important factor his company took into consideration when deciding whether to go with a package or new development was the fact that home-grown code can be fixed much more quickly and cheaply than a commercial package.

Skills

Every company interviewed said that skills were an area of concern. The problem is that as the programmers with CICS/COBOL skills retire, there are few new students coming out of college with these skills. One German company reported that they do not believe any German students learn COBOL any more, and this is certainly the impression many companies have although there are isolated examples of universities working in conjunction with IBM to encourage COBOL usage. However, how this issue affects the decision to house a new project in CICS or elsewhere is not clear cut, and depends on numerous other factors.

The first observation to make is that a number of larger companies do their own training of the new programming intake each year, and part of that is to teach CICS COBOL programming. It is claimed that this can actually be quite quick, especially if the students have the opportunity to work with existing CICS COBOL applications and mentors. One large bank said that the student training course is three months, and that includes the CICS COBOL education as well as familiarization with the company's own IT implementation. Another education facility commented that computer science knowledge had not proved essential in training its own staff – instead, the key factor was “aptitude and attitude”. However there is no doubt that this is an overhead some companies are increasingly reluctant to pay.

As well as being concerned about the overhead of having to retrain the computing graduate intake, another common concern over COBOL was that it reduces future flexibility. More and more companies are seeing value in using a more portable language for application development, such as Java, that enables applications to be ported to other platforms more easily. This allows changes to be made in the future as business needs alter. The other advantage of using something ‘open’ like Java is that it is generally much easier to find Java-skilled programmers in the marketplace, and buying these skills in is considerably less expensive than acquiring COBOL skills.

However, it was interesting that a decision to go with Java did not always force a decision to choose a non-CICS option for deployment of new projects. Java has been supported under CICS for some years now, and offers a number of advantages, especially if the new project has affinity to existing CICS-managed resources and applications. By running everything under CICS, the company can ensure that resource integrity is maintained, inter-application communications are at their most efficient and security is all managed under the same umbrella. In fact, a number of companies interviewed stated specifically that they wanted to deploy new projects under CICS using Java for skills reasons, although some did say they planned to wait for the CICS / Java enhancements coming in CICS TS V4.2, such as 64-bit addressing and multi-threaded JVMs.

Another approach adopted by most of the companies surveyed was to reduce CICS/COBOL skills requirements by service-enabling various CICS transaction for external consumption, for example as web services. This approach will be discussed in more detail in the next section. However, while this is a great way to leverage existing CICS investments and does reduce the need for COBOL skills, it does not remove that need entirely.

In situations where companies were looking to rewrite selected business applications, the skills issue was much more likely to result in the selection of a non-CICS option, particularly if the application being rewritten was relatively self-contained. Whereas once the selection of application development tools for the CICS environment made it very productive, this is an area where a number of respondents felt the gap had closed and indeed moved to favour the non-CICS vs CICS option. For instance, one logistics company said that it was gaining a great deal of success with a rapid application development approach using Linux-based tools, which was a major reason for not going with a CICS-based solution. However it is worth noting that IBM would claim its Rational toolset is a significant step towards restoring the balance.

Cost

Many companies came back with cost being a heavily weighted factor in the platform selection decision. Within the segment of companies who have a corporate strategy not to increase the mainframe workload in any way, cost was often quoted as the major reason, although some admitted that there was a certain element of politics too. There is no doubt that the mainframe platform is perceived to be expensive, with software costs being a particular concern. The other element of cost often mentioned was the high price of mainframe skills against those for other platforms and environments.

However, this in itself was interesting. When asked about cost, almost every interviewee brought up mainframe costs in terms of software license fees and the danger of needing an expensive hardware upgrade, and some mentioned the cost of skills. But from previous research Lustratus has carried out, these costs are most

definitely not the whole picture. When storage and network costs, space requirements and support costs are taken into account, it can change the picture dramatically.

Take the example of one medium-sized bank. This bank was looking at its options for its core banking applications, comparing mainframe affordability with a distributed, server-based solution. Based on its current implementation, which involved two mainframe images and 700 virtualized server images with roughly equal numbers of applications in the mainframe and distributed environments, the software costs were much higher on the mainframe compared to the distributed systems. Also, the cost of increasing the load was higher in the mainframe environment if it caused an upgrade to be needed, whereas it was more uniform in the distributed case. However on further analysis, it discovered that the 700 server images were consuming far more storage, networking and space resources than the two mainframe images, and that whereas 8 people were required to support the two mainframes, 30 people were required for the distributed images. When these additional factors were taken into account, the mainframe systems cost less than the distributed systems. This just illustrates the need to look at costs in a total cost of ownership (TCO) model.

Vitality

To be fair, this was not exactly a category that the companies in the research set were using to judge whether to place a new workload on CICS or not. Those companies interviewed were all reasonably up to speed on CICS developments recently, and were aware that some of the latest technology innovations, such as support for social networking integration and added business alignment through use of business rules and events, are now provided in the CICS environment. However, it is likely that in the wider CICS community there may be many companies who are not quite as up to date. Indeed, the vitality argument is one that often forms part of the justification for companies who end up in the first segment described earlier – that is, companies that have made a strategic decision not to place any more workloads on CICS.

In fact, recent versions of CICS have adopted some of the most modern technologies. The appendix provides a summary of the salient developments that have been delivered by IBM as part of the most recent release of CICS Transaction Server for z/OS.

Summary

For some companies the debates about what platform to use for new projects are largely academic. The decision has already been taken, usually through some form of corporate edict to either make CICS the preferred option for new business application needs, or alternatively to avoid putting any new workloads on CICS. However, for the rest of the CICS community the decision can be a complex one, involving many different considerations.

This analysis has outlined the major factors taken into account by a range of different company size, industry and geography of operations when making this platform selection. Of course, some of the factors may not apply to individual company examples. For instance, not all companies need to have five 9s of availability, or massive scalability. Others may be quite content with delayed access to data rather than demanding real-time data access to the corporate data stores. However many companies will find their decisions heavily influenced by skills availability and the affinity of the new project under consideration with existing CICS-based applications and data.

The key is for each of the areas discussed in this review to be at least considered for possible impact on the ultimate decision. This should provide a strong framework for accurately assessing the question of platform selection, ensuring that the final decision best matches the overall needs of the company.

Appendix - Modern CICS

Over the years, IT has changed dramatically. New technologies have emerged in abundance, offering opportunities for new forms of business solutions and greater efficiencies in existing ones. Despite the views of some executives to the contrary, CICS has not stood still in the face of these technological changes and the most recent versions of CICS, culminating in CICS TS V4, have incorporated a number of key new developments over the years that may have an influence on platform selection for new projects. This section summarizes some of the more pertinent CICS changes exploiting modern technologies.

Web Services - CICS as a Team Player

A good place to start is to look at how CICS plays in the wider IT landscape. It may be all very well having CICS as a fantastic platform for running the back-office business applications, but a productive business will be constantly looking at how to enhance/improve/exploit these capabilities in new ways. Web experts might want to offer new, easy-to-use, productive, browser-based front ends for clients and consumers to use, while still making the key business services available in this new environment. It is therefore imperative that the business value tied up in the existing CICS applications and packages can be leveraged. At a broader level, a company may have decided that it wants to move to a service-oriented architecture (SOA) where all IT-based business operations are made up from a shared pool of business 'services'.

Fortunately, CICS was upgraded with full web services support in CICS TS V3. Existing CICS transactions can be 'wrapped' to make them into consumable web or SOA services that can be accessed from any platform. IBM offers tools to help with achieving this aim, and there is also an array of third party tools that offer similar support. This level of choice is typical for CICS given the strength of its ecosystem. Whichever approach is used, the web services support immediately provides a way to make the reliable, high-performing CICS applications accessible to other platforms and environments, with the added benefit that the caller of the service does not need to know anything about CICS or COBOL, but simply what business operation the service will execute. This significantly adds to opportunities for reuse, thereby leveraging existing investments, reducing costs, speeding time to value and improving service quality.

Productivity – matching CICS to new skillsets

The CICS world was the centre of the universe for many mainframe companies for years, and even though this position changed long ago, there has been a heritage of 'specialized' skills required in the CICS environment. COBOL is still the most prevalent programming language, and the systems programming and operational support interfaces for CICS retain a lot of their 'mainframe' heritage.

However there have been dramatic changes in this area in recent releases. IBM has made major strides in making CICS an environment in which the modern type of IT graduates are much more comfortable and productive. There are three areas of particular importance, discussed below in more detail.

CICS Explorer

IBM has completely changed the interface for administering, managing and supporting CICS in recent versions. What used to be a process built around ISPF screens and JCL has now become an 'Explorer-style' interface where CICS systems and their resources are listed in hierarchical trees, and where the user can click on a resource to drill down and then operate on the resource through menu options. An important point to note is that CICS Explorer does not just manage IBM components, but third party ones too. It is built in Eclipse, and therefore supports plug-ins for anything else that needs to be included under its control.

CICS Explorer does a number of things. At one fell swoop, it eliminates a lot of the 'specialist' skills that have previously been required for CICS system programming and support. All of a sudden, new computing graduates will see an interface that feels much more natural to them, and which enables them to become productive much more quickly. But CICS Explorer also provides a convenient point to become the overall 'Window on CICS'. For example, problem determination and performance tuning information can now be displayed to the same single interface. This offers major productivity benefits.

CICS Java support

With many companies starting to look to maximize personnel skills investments by using portable languages like Java, CICS introduced Java support some years ago, allowing Java applications to run in their own virtual machines (JVMs) under CICS. This allows companies to reuse Java skills, acquired to support other platforms, in the CICS environment. Recently, IBM announced CICS TS V4.2 which further enhances this support. With this version, multiple CICS Java applications, including 64-bit ones, can now multi-thread on the same CICS JVM, delivering optimal performance with efficient storage utilization. IBM has also introduced OSGi support in this release, allowing dynamic deployment of Java application bundles that contain all the components that make up the run-time application. In essence, while previous CICS Java support was bringing Java capabilities to CICS programming, CICS V4.2 brings the CICS environment to the Java community. This widens the opportunities for CICS Java applications significantly, and makes the language a viable option for many CICS application needs.

CICS support for Dynamic Scripting languages

CICS has many different techniques for interacting with the user display, but they come from the historical design point of working with dumb screens. Obviously they have been upgraded over time, but modern programmers are much more likely to be used to using any of a range of dynamic scripting languages to handle web page creation and implementation. PHP and Javascript are perhaps two of the most common languages in this area. Now, IBM has built in support for dynamic scripting languages like PHP into CICS, starting with CICS TS V4. The ability to use PHP and the like in a CICS environment immediately opens up a wide range of possibilities for enhancing application user interfaces while at the same time leveraging this freely available pool of skills.

Driving new types of business solutions – CICS Web 2.0

As technologies have developed, new ways of using computing have emerged. A clear example of this is social computing, initially developed just for consumer entertainment but swiftly gathering momentum as an important area of product opportunity. Companies are realizing that young people today interoperate with advertising and make purchases in different ways, and there is much interest in information feeds, wikis, blogs and web-page based interactions through protocols like REST. These new Web 2.0 technologies open up all sorts of avenues leading to new business opportunities.

Once again, CICS has kept up with the times. In CICS TS V4, IBM has introduced support for a number of Web 2.0 technologies such as ATOM feeds and RESTful application models. CICS resources used today by existing CICS applications can be made available through these feeds without any changes to the CICS applications being required, allowing these resources to be viewed and manipulated using feed readers and aggregators, mashups and other Web 2.0-style applications. The key point here is that this can be done non-invasively – the CICS applications do not need to change.

Driving business agility and control – CICS BPM, Events and Rules support

A number of different approaches have emerged over the last ten years to assist in gaining better alignment between IT solutions and the business objectives they are intended to achieve. The key desire is to eventually be able to move to a more direct linkage between the business need and delivery of the IT solution to fulfil it. This can deliver much greater agility, and can also make it much easier to understand in business terms what is

happening in day-to-day business operations because the linkage between technical resources and the business needs they serve is improved.

Business Process Management (BPM) has been around for years, and describes the ability to describe process flows in terms of the business steps required to achieve them and then relate these steps to IT applications and programs. Through its support for SOA and web services, CICS already makes it possible for CICS applications and transactions to be viewed as part of a BPM flow, since each SOA service represents a sub-step of a process. However BPM is very much a strategic solution, requiring some considerable thought and then implementation.

Business rules and business events can provide a quicker way to start getting closer ties between technical implementations and business requirements. These two technologies are related but different. Business rules technology makes it possible to control the execution of a business transaction through a set of non-technical business rules that can be edited and deployed without the need for technical support or involvement. For example, a business rule might set the usage charges a bank makes to its customers. If the bank decides to offer students free banking, then a business user can simply edit the rule and change it to say that if the customer is a student, then there is no charge. Business rules are usually manipulated and managed through a Business Rules Management System (BRMS), such as ILOG in IBM's case.

While business rules are executed as part of the flow of a particular transaction instance, events extends this non-technical interface to business operations by allowing actions to be taken when a set of business circumstances occur. Events technology provides a non-technical interface for business users, both to define the business circumstances of interest, and to specify what action to take. As an illustration, a bank might want to be warned if a client suddenly starts to deposit a lot more money than usual across the range of investment vehicles offered by the bank. The intention might be to contact the client and arrange a meeting to see what else the bank might be able to offer, since it appears the client has come into new funds. This could be achieved by defining a limit of total aggregated investment deposits over a period of time, and an associated rule to be run if this limit is exceeded that flags the client to the local branch manager.

Business events provide a powerful tool to enhance business effectiveness while also delivering far greater business visibility into IT operations, enabling companies to monitor compliance more closely and compete more effectively.

CICS supports both business rules and business events solutions for CICS applications and transactions. The business rules support is provided through the IBM business rules engine based on the ILOG acquisition, and enables parts of COBOL applications to be packaged up as business rules. However the business events support can be provided non-invasively, which is extremely attractive to existing CICS users. Basically, users can link existing CICS processing, such as access to files, temporary storage or transient data queues, and program invocations, directly with business metrics and scenarios. These definitions are outside of the CICS application, so no application change is required. Once in place, the IBM business event processor will be able to detect the occurrence of the specified business event when the CICS resources that map to it are in the specified state.

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