



HYBRID MAINFRAMING

A Strategic Response to Challenges in Contemporary Mainframe Computing

Mainframes remain important and effective computing platforms in organizations that use them. The good news is that plans to migrate away from the mainframe have been largely abandoned given the current focus on IT efficiency. If anything, more workload is moving from the distributed computing world into the secure multi-tenancy of mainframe hosting. That said, there remain four significant challenges that confront mainframe computing as the New Millennium enters its second decade. Coping with these challenges will determine the success of mainframe computing going forward.

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For all of the industry analysis over the past decade heralding the imminent demise of mainframe computing, numerous recent surveys of business and technology leaders tell a different tale. In companies that have them, mainframes continue to serve as efficient and trustworthy platforms for business-critical information processing.

Moreover, the business value of mainframe computing, whether viewed from the perspective of IT cost-containment, regulatory compliance, business continuity or energy efficiency, is increasingly well understood. The contribution of a disciplined mainframe operation to the timely delivery of accurate information to business decision-makers is legendary.

Even the current discussion of cloud computing as an “innovative and compelling” model for corporate IT going forward has reinforced the value case of mainframes. Mainframe computers manifest today the characteristics that cloud evangelists promise to deliver in the future. “Resource pooling with dynamic allocation and de-allocation to business workload in a secure, predictable and standards-based way” – the mantra of most cloud-speak today – has been the hallmark of the mainframe for more than 30 years. In effect, mainframes are “natural” clouds.

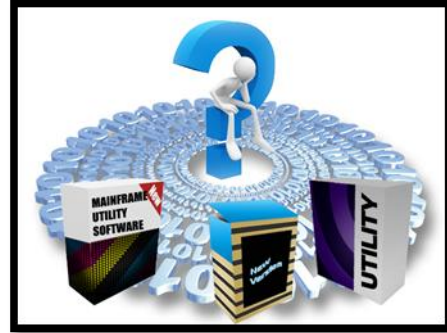
That said, the challenges cited by mainframe critics over the years are real and remain to be addressed. This paper surveys the four key challenges and introduces the concept of “hybrid mainframing” as a strategic framework for addressing them.

THE CHALLENGES TO CONTEMPORARY MAINFRAME COMPUTING

When the kernels of truth are distilled from the voluminous commentary of mainframe detractors that have appeared in the trade press over the past decade or so, four key challenges to the continuing value of mainframes appear. Collectively, these issues reflect changes in the environment or milieu in which mainframers perform their duties, rather than specific changes in the technology of the mainframe platform itself.

The mainframe has changed, of course. Improvements have focused on performance, stability and connectivity. To a certain extent, this has set the stage for one of the first

challenges confronting contemporary mainframers: the proliferation of software utilities intended to simplify the use of new features and functions. The deluge of such tools, which have been largely fielded by independent software vendors without any real integrated model for their deployment or use, have placed a burden on mainframers. The modern mainframer needs to become familiar with each tool, its capabilities and operational nuances, how to deploy it, and when to use it.



Given the small staff sizes in many mainframe data centers and the fact that mainframers today shoulder the burden of tasks that were once performed by a deeper bench of domain specialists, just finding the time to develop expertise new tools is a significant challenge.

The second challenge, again, has less to do with the mainframe platform itself than to developments in the business IT milieu overall. Many companies are migrating workload once hosted on distributed computing platforms back into the mainframe data center. There, it is hoped, the workload will be provided with resources and services that will improve the efficiency of its processing.



To some extent, this trend suggests that mainframers are becoming the victims of their own success – their excellence in operating traditional workload with high efficiency and availability and at less operational expense when compared to similar work operated on distributed computing platforms. The expectation is that the migration of distributed workload into the mainframe environment will imbue it “magically” with the signature discipline of mainframe computing.

To a certain extent, these expectations are fanned by IBM™ marketing around zEnterprise™, its new product strategy for connecting x86 blade servers (hosting certain distributed computing workload) directly to the mainframe with the ultimate goal of extending the umbrella of systems management that delivers enormous value in the mainframe space to the newly-connected blade systems and their peripherals as well. This builds on prior marketing from IBM aimed at encouraging customers to migrate

Linux and UNIX workload off of x86 platforms altogether and into the Logical Partitions (LPARs) of the mainframe.

The adoption of such mainframe-centric alternatives to x86 server consolidation strategies that rely on hypervisor software “virtualization” remains to be seen. However, in the view of many IT managers and planners, the mainframe has become a magnet for workload once performed on distributed platforms. To the extent that this “foreign” workload is accompanied by “foreign” operating system software and hardware components, the contemporary mainframer will be challenged to develop new skills, new methods and new procedures in order to cope.

Again, the smaller staff complements of most mainframe shops, a product of years of downsizing and attrition, leave mainframers less time to learn the nuances of new workload and gear and to develop operational procedures for managing a more complex environment. This challenge is significant going forward.

The third issue relates to the preceding two. Shrinking mainframe staff sizes are blurring the lines of responsibility and domain expertise that once defined a well-managed mainframe operation. Today, for example, it is not unusual to find a database administrator who allocates his own storage or defines user privileges within the security regime that has been instituted on the mainframe. These tasks were once performed by specialists or domain experts dedicated specifically to storage or security management.



This new reality – a blending of traditional staff roles and responsibilities – has been handled well, for the most part, by current mainframers. Partly, this may be attributed to the methodology used in the past to “grow” mainframer skills and competence: novices would advance their careers by spending time in different specialty areas and performing the tasks and procedures associated with each role until finally arriving either in a managerial position or settling into a specific domain of expertise. They acquired, via this development process, skills in many areas of mainframe operations that serve them now in their new less well demarcated jobs.

Nonetheless, the blurring of job descriptions for mainframers is a challenge going forward – both to mainframers themselves and to the process by which new mainframers are taught their trade. Transferring a well-defined body of skills and

knowledge to next generation mainframers is comparatively easy when compared to the challenge of transferring the knowledge associated with a job that has constantly shifting boundaries.

That assumes, of course, that next-generation mainframers are available in adequate numbers to replace the current generation of mainframers, whose average age is approximately 53 years. This is the fourth challenge confronting the future of mainframing: the development of a new generation of programmer/analysts, systems programmers, database administrators, security administrators, and platform specialists to replace current-generation mainframers as they reach retirement age.



This issue has been discussed for years, not just with respect to mainframe staff, but across the entire IT landscape. We have seen a decline, since the late 1990s, in the numbers of candidates for degrees in computer science and computer engineering in colleges and universities worldwide. While this insight has been contextualized by mainframe detractors as a proverbial death knell for the mainframe platform, skills shortages are likely to impact distributed computing staff much sooner than mainframe staff owing to the much larger staffing requirements in the distributed world.

It is interesting to note that younger people are much more technology-savvy today than ever before, their knowledge and skills cultivated through daily interaction with the internet and with applications such as social media and on-line gaming. Needed is a way to build on the familiar (the skills that these novices already possess) to the new (mainframe skills). Again, this challenge is exacerbated by the blurring job descriptions of mainframers today, which makes the definition of a body of transferable skills and knowledge associated with a specific role more difficult.

ENTER HYBRID MAINFRAMING

Taken together, these four challenges constitute a significant problem for mainframe computing in the next decade. To address them, we need a realistic strategy. In this context, the term “realistic” means a strategy that can leverage work that is already being done – and that to some extent has begun to yield workable tools – within the industry and the broader community of technologists.

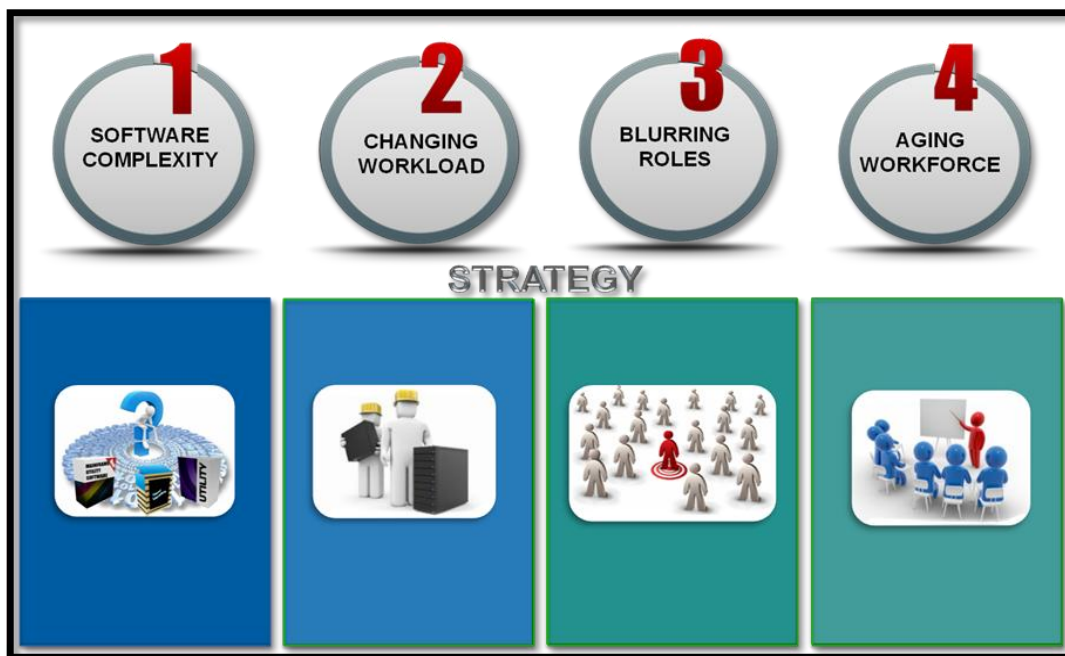
The term “hybrid mainframing” comes to mind as an apt descriptor of such a strategy. While it may connote some sort of genetic experiment, this is not the intent. Hybrid, in this sense, refers to a combination of two or more things into a more successful thing.

This is what initiatives like zEnterprise from IBM have tried to do with the traditional mainframe, blending the technology of distributed computing with its core centralized mainframe platform to achieve a visionary goal of distributed workload with centralized management. What is zEnterprise if not a hybrid mainframe model?

Hybrid mainframing requires “hybrid mainframers” and this too is already happening. The blurring of roles described above is actually a reflection of adaptation: mainframe staff are adapting to changing environmental factors, including the collapse of traditional, well-defined skills domains and the increasing complexity of platform and workload.

Hybrid mainframing is inevitable if the mainframe is to survive and to flourish. A strategy that embraces the concept is intended to manage the evolutionary process so that desirable outcomes are more likely to result.

A strategy of hybrid mainframing keys to the issues previously discussed. For each challenge, we need a strategy to address it. The framework is represented simply in the illustration below.



In an ideal situation, there is a strategic policy and toolset to address each challenge directly. Unfortunately, this is not always the case, but progress is underway.

ADDRESSING THE PROBLEM OF SOFTWARE COMPLEXITY AND PROLIFERATION

The challenge of software complexity, for example, is a multi-faceted one. Again, the issue is directly related to the proliferation of software utilities that have been introduced into the mainframe operations environment with the goal of simplifying tasks and making their execution more efficient.

What is needed is a comprehensive strategy for managing and integrating these software utilities so that they deliver their intended value without further contributing to complexity and inefficiency. A hybrid strategy, therefore, must provide

1. mechanisms for installing, deploying, configuring and maintaining these tools in a more automated way, and
2. means for using tools efficiently to perform work.

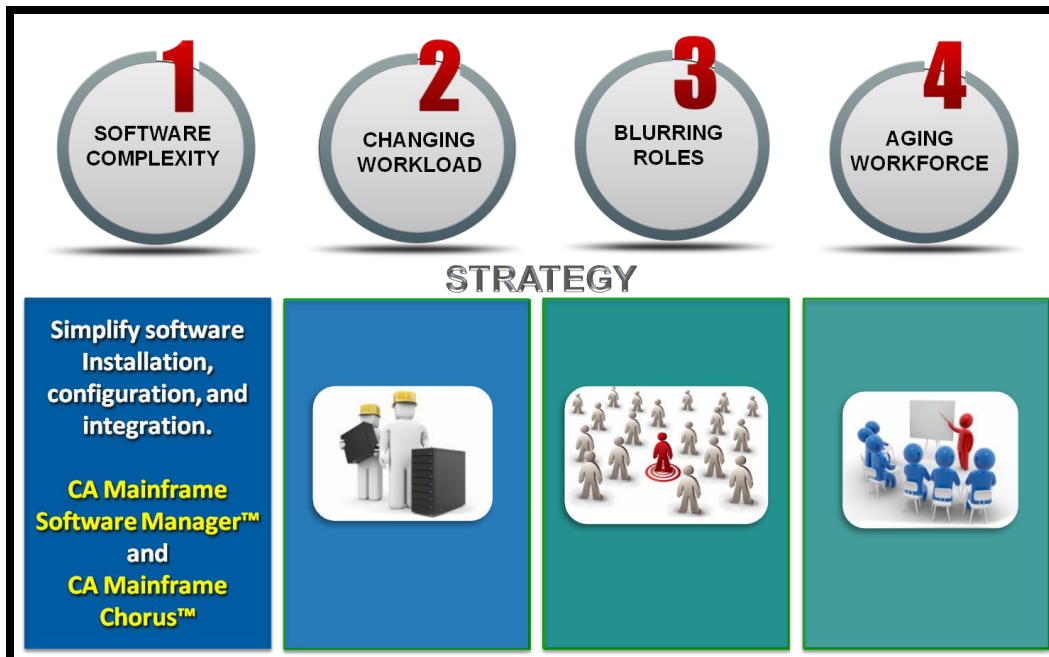
On the first point, there is some good news. Software installation and administration solutions – notably, CA Mainframe Software Manager™ (CA MSM) from CA Technologies – are well along their development path.

CA MSM, which can be likened to a hybrid technology that combines mainframe installation methodology with functionality similar to “install shield” utilities commonly used to deploy applications in the personal computing world, was introduced in 2009 and continues to improve its functional capabilities. Today, CA MSM delivers the means to ascertain quickly what utility software is available on the mainframe, its version level, and what software could be deployed to address gaps in our management paradigm.

CA Technologies has made great strides with CA MSM to simplify the acquisition, installation, deployment and maintenance of CA software for z/OS and will ultimately deliver the capability to automate and simplify configuration, as well. The technology is limited to the installation, deployment and maintenance of CA Technologies software today, but CA Technologies is reported to be preparing a software development toolkit that in the future will enable third party utility software developers to leverage MSM with their products.

Products like CA MSM provide a partial solution to the challenges posed by the proliferation of utility software in the mainframe shop. But we still confront the problem of how to wrangle all of our tools and applications into a common unified workspace.

To meet this strategic challenge, CA Technologies has introduced its burgeoning CA Mainframe Chorus technology. CA Mainframe Chorus creates a graphical workspace where a mainframer can organize all of his or her software tools and perform work in a more efficient and intelligent way. In fact, CA Mainframe Chorus addresses more than the utility integration issue that confronts the mainframe; it delivers capabilities that could factor into the resolution of the other challenges enumerated above that make it a potentially important part of a hybrid mainframing strategy going forward. For now, CA Mainframe Chorus is noteworthy because it provides an interface and workspace for mainframe software integration that delivers the sort of intuitive interface that one expects from an Apple™ iPad™ or a Google™ smart phone. That is another example of hybrid concepts already entering the mainframe experience.



ADDRESSING CHANGING WORKLOAD CHARACTERISTICS

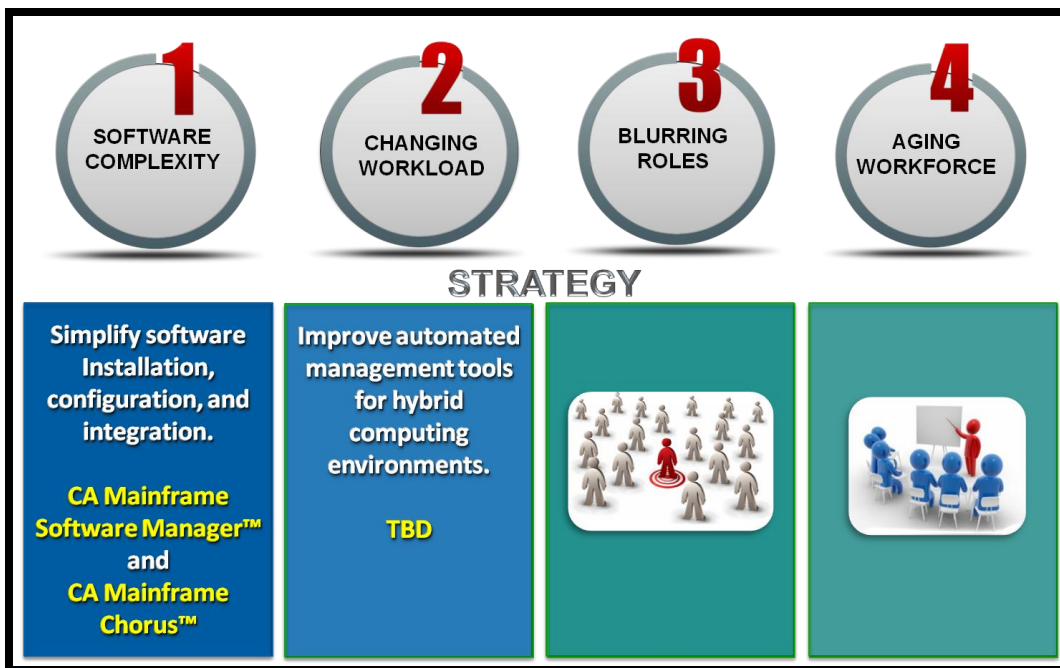
As cited previously, in addition to utility software proliferation, the mainframe computing model itself is also undergoing change. With the advent of initiatives like LPAR-based virtual server hosting and zEnterprise, more and more distributed applications, workload, and peripheral technology are being migrated into the mainframe complex or are being placed under the auspices of mainframe-centric management.

This trend has raised quite a bit of concern among traditional mainframe administrators because of the lack of unified tools for infrastructure management, data protection, and security that can bridge the gulf between mainframe and distributed environments.

Blade servers and their storage may be tethered to mainframes, but that doesn't automatically mean that the management discipline for which the mainframe is known will automatically extend out to the new components that are being attached to it.

This is a "good news, bad news" situation. The good news is that mainframes themselves are being recognized as strategic and central to a new hybrid computing model. That bodes well for the future of the platform. The bad news is that it will take time for management software to catch up and to address the new challenges posed by new workload and infrastructure.

Fortunately, IBM and CA Technologies have a deep bench of software products focused on both mainframe and distributed computing management requirements. Depending on how quickly zEnterprise is adopted, a unified management solution for hybrid mainframing may appear from the industry in the near term. For now, however, this is a part of the strategic framework that requires significant development.

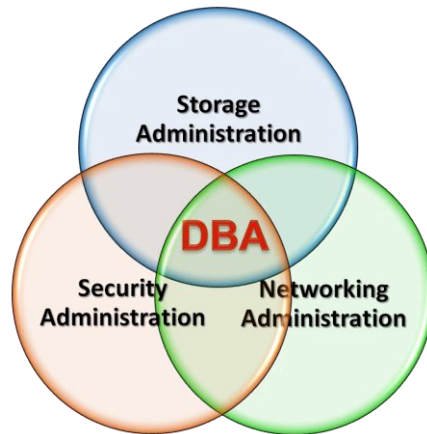


THE CHALLENGES OF BLURRING ROLES AND AGING WORKFORCE

As previously noted, a decade of downsizing and rightsizing in the rank and file of most business organizations has not left the mainframe data center unscathed. Whether through unaddressed attrition or deliberate reductions in force, there are now fewer

operations personnel in the contemporary data center who are shouldering more responsibilities than ever before.

This situation comes at a time when mainframe workloads are increasing and infrastructure is becoming more complex. Rather than parsing tasks among a carefully delineated cadre of domain experts, application administrators are now required to undertake work that was previously delegated to specialists– from resource allocation to security access control. At database administrator (DBA), for example, may find his or her responsibilities expanding to include storage administration, security administration and even networking/datacom tasks. To maintain acceptable levels of performance, administrators need to leverage a growing number of software utilities – assuming, that is, that they can find time to master any of them!



The challenge of blurring roles overlaps the fourth strategic challenge confronting the mainframe – that of cultivating a cadre of mainframe operations personnel to take over when the current generation of mainframers retires. At the same time that they must tackle the challenge of evolving job descriptions, experienced mainframers also need to find time to mentor the next generation.

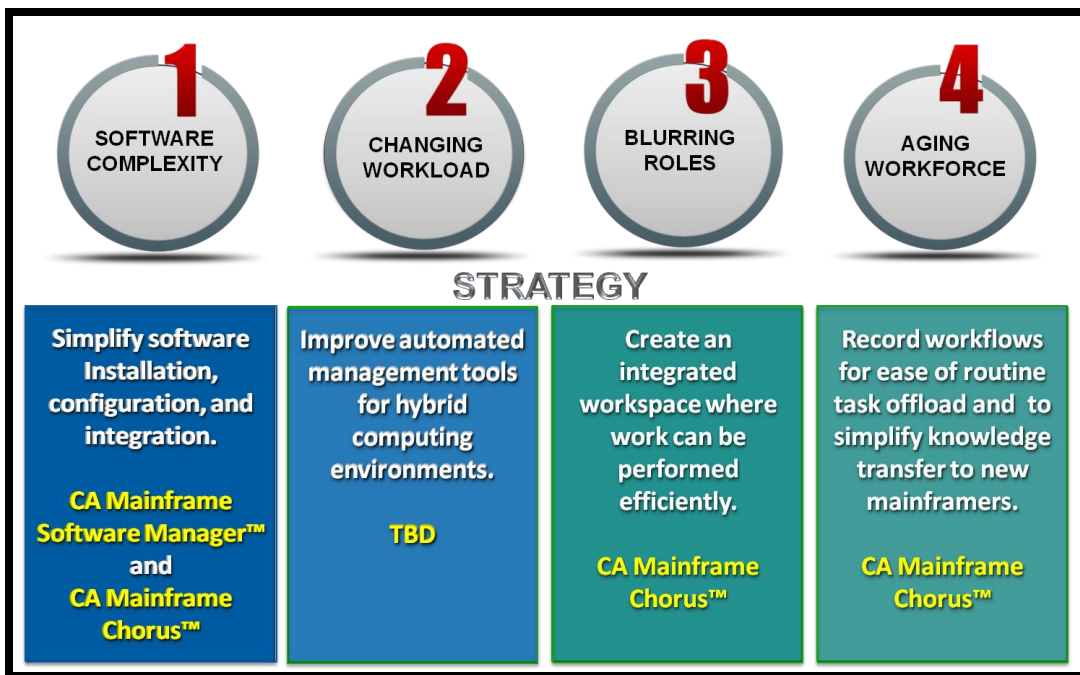
There is a tendency among many mainframers to disparage the new generation of IT operators. It is true that the new computing workforce isn't typically well versed in mainframe architecture or operations. The skills they do possess tend to be oriented more toward the Web or to server-centric application development models.

Thus, the technology of the mainframe needs to be made accessible to them in more familiar ways. Again, CA Mainframe Chorus may provide the framework of a strategic hybrid solution...for both challenges.

CA Mainframe Chorus leads the field of efforts to establish a customizable workspace for use by the contemporary mainframer in doing his or her multi-faceted job. The workspace can bring together all of the tools the mainframer uses in one place, journaling whatever work he or she performs, and enabling commonly performed workflows to be stored as routinized tasks that can be handed off to novice mainframers who are just learning the ropes.

This serves two essential goals: first, that of simplifying the integration of multiple software tools and enabling the mainframer to keep track of the many tasks that he or she is undertaking in one convenient place. That seems to be an effective replacement for multiple monitors supporting multi-tasking, with all of the stickies and spreadsheets used to keep track of it all.

The second benefit of CA Mainframe Chorus is that it enables knowledge transfer. As workflows become more standardized, it is easier to communicate them to mainframers-in-training and perhaps to offload routine tasks to novices who have their own workspaces for working with the platform. Since the interface to CA Mainframe Chorus has a familiar look and feel for those who are well versed in web technology, the CA Mainframe Chorus workspace is likely to be less intimidating than typical mainframe terminal interfaces might be to a newbie.



A HYBRID STRATEGY FOR A HYBRID FUTURE

In the final analysis, the challenges to the future of the mainframe are real and a product of the evolution of the mainframe experience itself. Changes in the mainframe platform, workload, staff structure and workforce capabilities are driving the need for change in how we conceptualize and use the mainframe resource going forward.

This paper merely illustrates in a simple way how hybrid mainframing strategy, leveraging technologies that borrow from other platforms – from PCs and server computing to smart phones and the world wide web, will be required to keep the mainframe computing paradigm a viable one in the future. CA Technologies is clearly ahead of the curve in the development of next generation technology to support next generation mainframe requirements.