PLANET MAINFRAME

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Interested in writing for Planet Mainframe? Please contact us with your idea, relevant experience, and any other information that can provide additional details for your article.

At *Planet Mainframe*, we aim to share and nurture the ideas of mainframe experts and enthusiasts. It is a vendor-neutral publication where differing opinions about 21st-century data centers and personal perspectives on innovative technologies are welcome. What is the future of mainframe? Also, what do you think is missing? Our contributors open the door to dialogue within the industry. We recognize the importance of sustaining this community not only for mainframe virtuosos whose much-valued experience is a continuum. We believe it is essential to entice those who are juniors within the field or consider it to continue the conversation.

What is the *Planet Mainframe* ethos? We are value driven. We respect the expertise of our contributors and the value that these perspectives encompass. We are your go-to source when a conversation is needed. Do you have something you would like to share? People are looking forward to reading what is on your mind. In this issue, Matthew Wyatt poses a quite familiar question that the new generation asks, "what is the mainframe anyway?" in his article, *My IBM Z Xplore Experience as A Complete Mainframe Beginner*. There is a need to empower future generations through education. Our goal on *Planet Mainframe* is also to educate and inform those who may not know what big iron is!

Another great read, *Mainframe Cost Control Through Query Optimization*, by Larry Strickland, Ph.D., Chief Products Officer of *DataKinetics* and *IBM Champion*, explores using both IDAA and IZTA for query optimization in both the transaction processing and analytics processing worlds. Strickland continues the conversation with his thought-provoking and well-rounded leave-no-stone-unturned approach in the article, *Greening the Mainframe Grass: How to Optimize ROI For Mainframes*. Christopher Tozzi Ph.D., Senior Lecturer, Science and Technology at *Rensselaer Polytechnic Institute*, in the article, *Best Practices for Closing the Mainframe Security Gap*, offers great insights on mainframe security risks and security gaps.

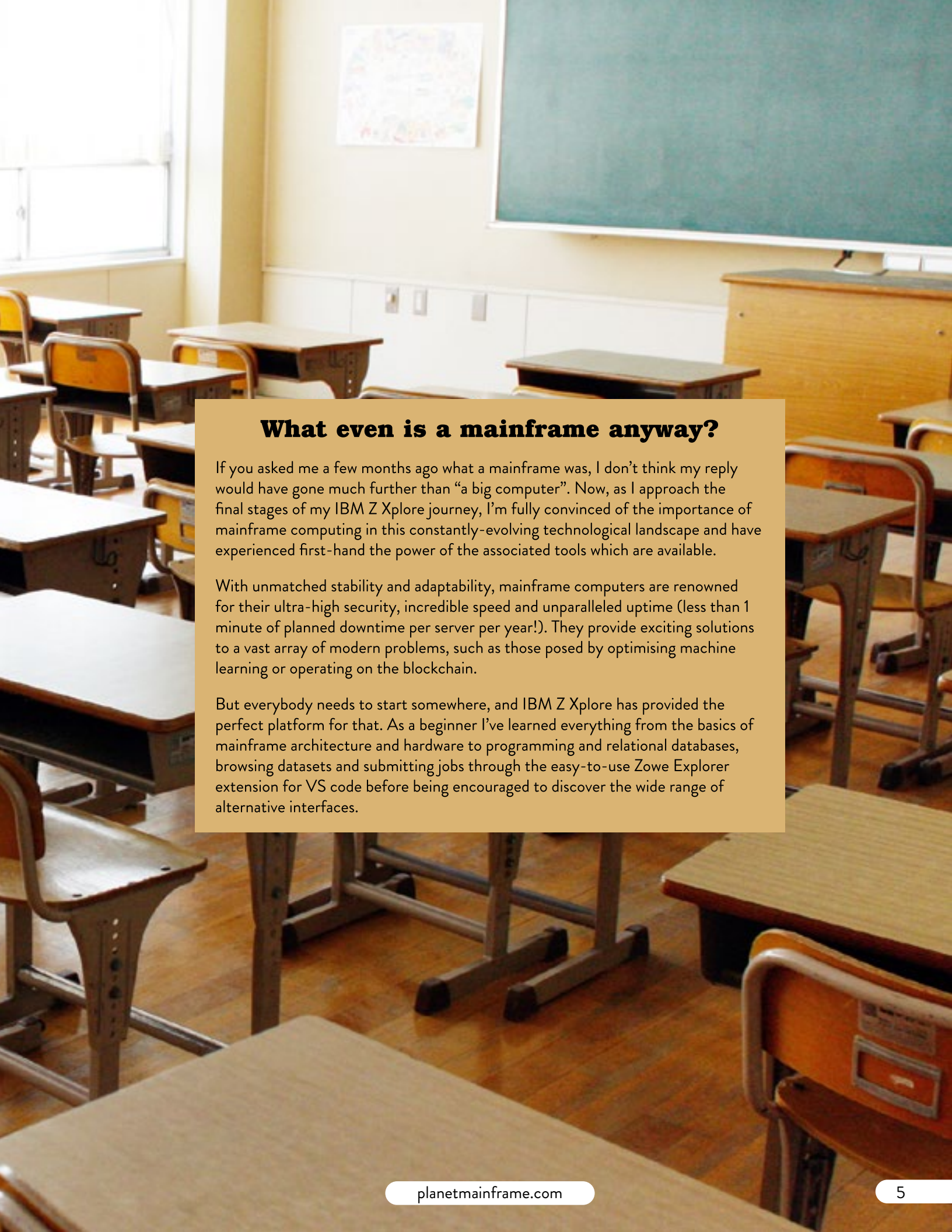
Planet Mainframe Contributing Editor Keith Allingham, author of the article, *ReBoot Hill Revisited*, featured in this issue adds to conversation and will enliven mainframers to think freely. Allan Zander, CEO of *DataKinetics*, shares his personal connection to the mainframe in the article, *My Great Uncle Was a Farmer So I Am a Mainframer*. The journey to the mainframe for many often has its roots in a person or moment in time that inspired an individual to embark on a career in the mainframe world. What led you to the mainframe? We would love to hear your story. To round out this issue, Nathan Brice, IBM Program Director, Product Management, GDPS, provides great advice on how to protect your business in the article, *Why You Need to Protect Your Business with IBM Z Cyber Vault*.

What is on the horizon for *Planet Mainframe*? We look forward to continuing these great conversations in person at expos around the globe. As Managing Editor of *Planet Mainframe*, I hope to bridge the gap and entice new IT developers to see the value of mainframe computing while at the same time inspiring a thought-provoking forum where senior professionals within the industry can share insightful outlooks. The sustainability of the mainframe is reliant on mentorship and community, thus encouraging understanding. The mainframe is truly alive and well.

Hanifa Anne Sekandi
Planet Mainframe—Managing Editor

My *IBM Z Xplore* experience as a complete mainframe beginner

Matthew Wyatt



What even is a mainframe anyway?

If you asked me a few months ago what a mainframe was, I don't think my reply would have gone much further than "a big computer". Now, as I approach the final stages of my IBM Z Xplore journey, I'm fully convinced of the importance of mainframe computing in this constantly-evolving technological landscape and have experienced first-hand the power of the associated tools which are available.

With unmatched stability and adaptability, mainframe computers are renowned for their ultra-high security, incredible speed and unparalleled uptime (less than 1 minute of planned downtime per server per year!). They provide exciting solutions to a vast array of modern problems, such as those posed by optimising machine learning or operating on the blockchain.

But everybody needs to start somewhere, and IBM Z Xplore has provided the perfect platform for that. As a beginner I've learned everything from the basics of mainframe architecture and hardware to programming and relational databases, browsing datasets and submitting jobs through the easy-to-use Zowe Explorer extension for VS code before being encouraged to discover the wide range of alternative interfaces.

Everybody needs to start somewhere, and *IBM Z Xplore* has provided the perfect platform for that.

My personal highlights: retro interfaces, containers and the IBM LinuxONE

I've thoroughly enjoyed exploring the mainframe through UNIX System Services, getting to grips with the Zowe Command Line Interface and tackling the challenge of writing my own programs in languages like Rexx and Python. I even had a go at using an IBM 3270 terminal (well, an emulation of one), which displays jobs and data in a lovely 80 character wide "green screen" from the 1970s!

I particularly enjoyed the activities involving the IBM LinuxONE system, being given the opportunity to access a virtual machine to play with completely for free. Here I was able to see the true capability of the mainframe and experiment with powerful tools such as Docker and Ansible to open up a world of possibility for containerisation and automation.

Get ready for the next challenge

It's very clear to me that the mainframe community is continuously building and improving on solutions to stay at the forefront of data-handling and computation, and with new IBM Z Xplore challenges being added all the time, I look forward to being a part of it. Remember, the learning journey never stops!

If you're interested in finding out more about IBM Z, I highly recommend the IBM Z Xplore platform. You can get started with it here:
https://ibmzxplore.influitive.com/users/sign_in

Mainframe cost control through query optimization

Larry Strickland

The challenge—divergent needs

Viewing IT as a business enabler but also as a major cost center, business leaders demand that IT management find a way to reduce their budget while continuing to deliver excellent performance and availability in an ever more dynamic world. Increasing complexity, higher transaction volumes, and the accelerated growth in both data stores and the need to access this data make it challenging to manage the existing budget, let alone find ways to reduce costs.

At the same time, customers and employees demand even more responsive online applications, while expecting on-demand analytics workload results. The larger the shop, the greater the customer base, and the more difficult it is to find a way to cost-effectively deliver the performance required. As processor speeds continue to increase, data access is the lagging performer. As is often quoted, 'all processors wait at the same speed.'

Traditional methods for increasing processing performance tend to cost a lot of money and deliver variable results, not the guarantee the IT manager needs. Attempts to exploit memory for performance improvement offer variable results as the kinds of data and varieties of queries—i.e., transactional and analytical—makes it challenging to achieve any substantial 'wins.' The mainframe presents a particular problem given the high capital cost of the hardware and even higher costs of the systems software.

Half-measure solutions

There is no silver-bullet solution to this challenge, and any single solution would be a half-measure solution. Here's why—transactional queries and analytics queries are completely different problems that need to be addressed in completely different ways, especially in large mainframe shops.

For transactional queries, up to 80% of database calls target reference data, data which is frequently read, but much less frequently updated. Calls to large databases usually involve 'joins' to these reference table—these are the ones most responsible for the high overhead and performance impacts on transactional queries. Though many have tried CICS Managed Data Tables (CMDT) or other buffering or in-memory options, the reduction in resource demand hasn't been sufficient.

For analytics queries, there are completely different things at play. Historically, organizations built completely separate analytics decision support systems. But with the growing need for real-time analytics information, multiple platforms with their inherent data transport delay were clearly not the answer. Unfortunately, running analytics queries directly from the mainframe DB2 database doesn't work well either, as long-running analytics queries are, by definition, long-running; i.e., they take time to complete. They also consume significant CPU resources on the mainframe, which contributes to the cost of ownership operational expense, and even capital expense costs.

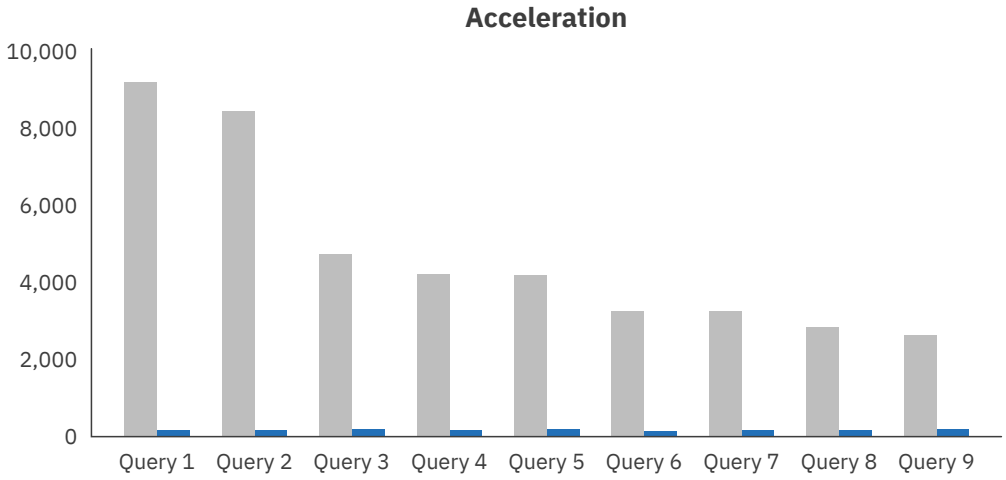
Two separate and unrelated problems are best addressed by two well-targeted solutions.

The solution—two different solutions for two different problems

1. Long-running analytics queries

More data generally means more cost to access and manage it. Thus, tuning activities can provide huge benefits in performance and consistency, ensuring end-user satisfaction regardless of demand fluctuations. Large, complex database queries are the focus for many analysts; these resource-intensive transactions stand out with longer response times and higher resource usage.

IBM's Db2 Analytics Accelerator (IDAA) has a well-deserved reputation as a solution that provides significant performance increases for large systems running data-intensive and complex analytics queries. Using hardware accelerators, IDAA is designed to optimize complex queries often associated with analytics and other long-running queries.



			Db2 Only		Db2 with IDAA		
Query	Total Rows Reviewed	Total Rows Returned	Hours	Sec(s)	Hours	Sec(s)	Times Faster
Query 1	2,813,571	853,320	2:39	9,540	0:00	5	1,908
Query 2	2,813,571	585,780	2:16	8,220	0:00	5	1,644
Query 3	8,260,214	274	1:16	4,560	0:00	6	760
Query 4	2,813,571	601,197	1:08	4,080	0:00	5	816
Query 5	3,422,765	508	0:57	3,420	0:00	70	58
Query 6	4,290,648	165	0:53	3,180	0:00	6	530
Query 7	316,521	58,236	0:51	3,120	0:00	4	780
Query 8	3,425,290	724	0:44	2,640	0:00	2	1,320
Query 9	4,130,107	137	0:42	2,520	0:00	193	13

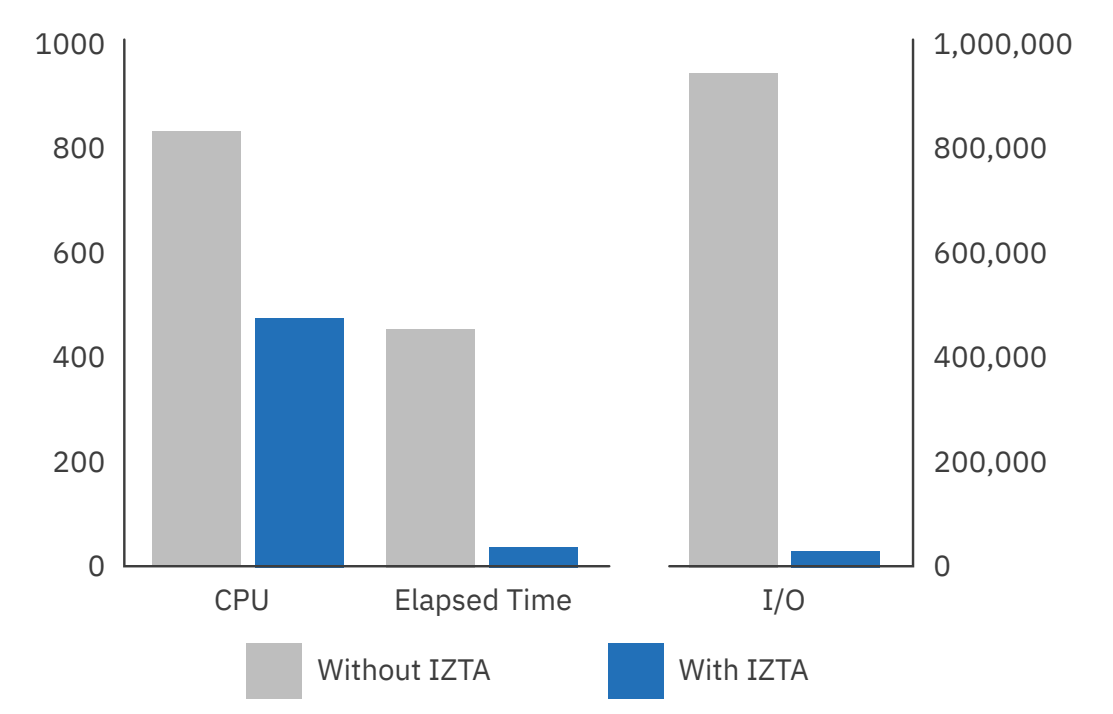
The above image shows IBM's numbers for expected performance improvements for long-running queries. The numbers are impressive—actual customer performance improvement numbers seem to range from just over 10 up to 100 times faster.

What the numbers do not say is how much faster short transactional queries will run, and that's because IDAA is not designed to improve performance for those types of transactions. For that, you need a Db2 accelerator.

2. Short transactional queries

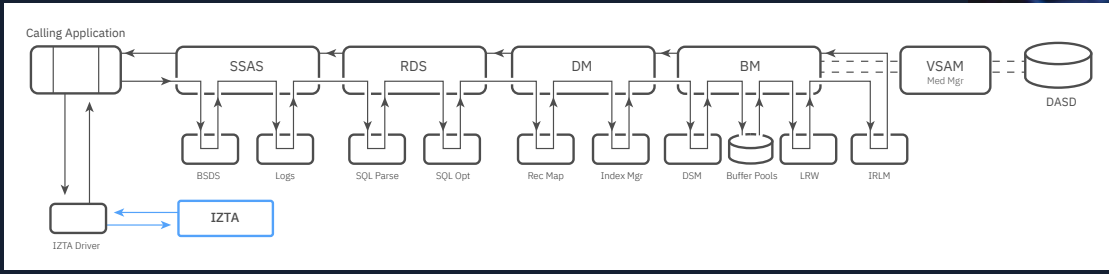
Short-running queries are often not considered to be of great concern because each one uses very few resources. However, some of these queries are run very often- sometimes millions, or even billions of times per day. The overall impact of performing many short-running queries many times can have as much impact as performing long-running queries.

Using an in-memory accelerator, with access-optimized in-memory tables to improve access time for short-run queries, is how IBM's IZTA provides dramatic reductions in resource usage with a patented technique to reduce the access path to data in memory. When implemented for high-volume OLTP or I/O-intensive batch systems, reductions in CPU range from 70–98% are not uncommon, depending on the specific workload. An additional 86–91% CPU reduction was achieved over fully-optimized Db2 buffer pools. The image below shows real customer results—after having done all they could optimizing their Db2 buffering, they were able to gain much more performance using IZTA.



Reduction of CPU use frees up resources for other applications. By reducing the cost of the application, IZTA also helps defer hardware upgrades—and the longer you wait, the less expensive hardware tends to get. Since all major changes to the infrastructure come with increased risk, avoiding these changes increases application availability. In addition, by lowering the cost, the business tends to make a greater per-transaction profit.

IZTA makes this possible by making it possible to relocate the data used most often by an application much closer to the application—and allowing the application to access that data using a very short code path. The image below shows the dramatic difference in code path length.



From 5% to 20% of the data accessed by a given application can be copied from the database into access-optimized in-memory tables. This data are then accessed from memory up to 100x faster than otherwise possible using buffering techniques.

IZTA works best for tables less than 2GB in size with an R/W ratio of 100:1 or more. By focusing on long-running and/or CPU-intensive jobs in the SMF type records, then looking for files with high reads per day and high reads relative to row numbers, IBM can help you find the low-hanging fruit for huge CPU savings, which can turn into substantial real dollar savings. In an environment where I/O is $30 per, savings can quickly amount to millions of dollars.

Business benefit

I/O still represents the slowest component of transactional, batch, and analytics work, and it adds significantly to the resource-usage cost of most large enterprises. With IZTA and IDAA, customers can see significant savings quickly, reducing EXCP counts dramatically (much more than can be done using standard buffering techniques). These cost reductions can also, in many cases, result in software cost savings by lowering the R4HA for those who leverage sub-capacity pricing options, depending upon current service agreements.

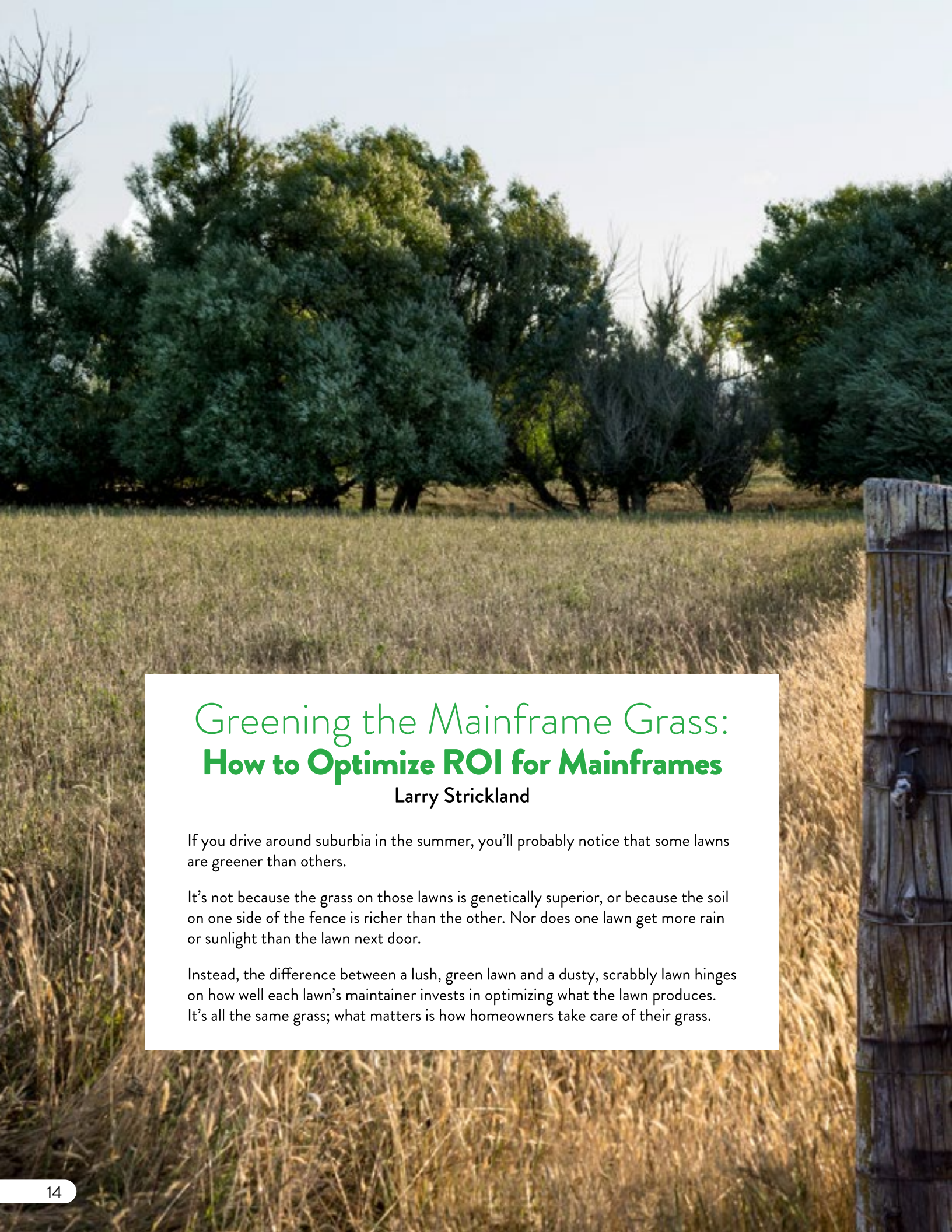
When resource usage is reduced, there is a corresponding saving on processor and software costs; hardware upgrades can be delayed, which results in a lower mainframe total cost of ownership. By deferring costs, more investment in new technologies and applications is possible. As many companies spend 80% of their IT budget on maintenance, freeing up funds for new development can greatly enhance business competitiveness. Even better, by reducing the slowest component of the system (I/O), performance improvements can be achieved in batch, OLTP, and analytics workloads, which result in increased customer (and employee) satisfaction.

Conclusions

While IDAA adds value by optimizing the more infrequent, but large analytics-based SQL queries, IZTA adds value by optimizing the more frequent, but smaller transaction-based queries. IDAA and IZTA together can help you achieve truly optimized queries allowing you to take full advantage of your hardware spend while delivering on tough service level agreements.

With business leaders demanding reduced IT budgets while maintaining high levels of performance and availability, IT management must have new solutions—for both new long-running analytics queries AND traditional short transactional queries. Two separate and unrelated problems are best addressed by two well-targeted solutions. IDAA and IZTA can provide performance improvements for both long-running and short-running queries, and they can help them to run 100 times faster. This translates into significant reductions in IT operational expenses, combined with an ROI of fewer than 12 months.

If you're using both IDAA and IZTA, you're at the forefront of query optimization excellence—in both the transaction processing and analytics processing worlds.



Greening the Mainframe Grass:
How to Optimize ROI for Mainframes

Larry Strickland

If you drive around suburbia in the summer, you'll probably notice that some lawns are greener than others.

It's not because the grass on those lawns is genetically superior, or because the soil on one side of the fence is richer than the other. Nor does one lawn get more rain or sunlight than the lawn next door.

Instead, the difference between a lush, green lawn and a dusty, scrabbly lawn hinges on how well each lawn's maintainer invests in optimizing what the lawn produces. It's all the same grass; what matters is how homeowners take care of their grass.

What color is your mainframe?

Mainframes are similar to lawns in the respect that it's not the underlying mainframe infrastructure that determines how well your mainframe functions. It's the way you use that infrastructure, and how much care you put into optimizing it.

After all, most mainframe systems today look more or less the same from a hardware perspective. They're also similar from a high-level software perspective, because almost all of them run the same IBM operating systems.

Yet, if you look around the mainframe landscape today – as we often do at DataKinetics as part of our mission to help businesses optimize mainframe performance and cost – you'll notice that there is a huge variation between companies with regard to how much value they get out of their mainframes. Some mainframes are the equivalent of beautiful, well-maintained lawns, while others are parched patches struggling to justify their purpose.

Understanding the reasons behind these different outcomes is critical for any business that wants to make the most of its mainframe systems. And given that mainframes are used by 71 percent of global Fortune 500 companies – and that they power 68 percent of the world's transactions – learning how to optimize mainframe performance while minimizing cost is a clear priority for businesses across the planet.

To that end, this article unpacks the main factors that shape mainframe outcomes. In other words, it explains how to optimize the ROI of mainframes by deploying cost-management and optimization strategies that maximize the speed and performance of mainframe workloads while minimizing energy, maintenance and integration costs.

Mainframes want to save you money...

The most important thing to know about mainframe cost optimization is that mainframes are designed to be cost-effective. Consider data points like the following:

- Mainframes consume 50 percent less energy than x86 machines when running workloads of equivalent capacity.
- Mainframes take up less physical space than commodity servers, which leads to lower real estate costs.
- On the whole, labor costs for mainframe maintenance are 50 percent lower than for centralized server environments.
- IBM Z runs 70 percent of business workloads at 10 percent of total IT cost – whereas distributed platforms handle 30 percent of workloads at 90 percent of IT cost.

The point here is that choosing to host workloads on mainframes sets you up for financial success by default. It's not as if mainframes are hard to cost-optimize; on the contrary, mainframes are designed to save you money without compromising performance or reliability.

...But mainframe cost blunders abound

However, whether you actually yield a high ROI on your mainframes hinges on how effectively you leverage the unique functionality of mainframe systems.

Common mistakes that we see in the industry that undercut the value of mainframes include:

Lack of cost visibility: This is probably the single biggest cause of low mainframe ROI. Businesses just don't know how to calculate their mainframe TCO, so they lack a baseline for measuring and improving financial performance in the mainframe context.

Underestimating software licensing costs: The greatest cost in most TCOs is software licensing costs, not mainframe infrastructure costs

Unnecessary migrations: Sometimes, businesses decide they should migrate away from mainframes due to a perception that mainframes are outdated. This is a huge mistake in most cases not only because mainframes are not at all obsolete (on the contrary, as noted above, they continue to power a majority of global transactions) but also because organizations often underestimate the challenge of getting mainframe workloads to run well in commodity servers across all stages of the SDLC—dev, test and prod.

If you desire to get the most out of your mainframes, you need to keep your workloads running on them. Rather than on more costly commodity servers—in ways that minimize your licensing costs and allow you to achieve continuous visibility into your mainframe spend and total TCO.

Greening the mainframe: How to optimize mainframe ROI

How, specifically, do you achieve those goals?

The answer starts with keeping your existing mainframe workloads running. Doing so avoids the major expense of migrating to commodity servers, as well as the cost of operating those servers—which, as we've noted, is much higher than mainframe operating costs.

At the same time, though, it's critical to modernize your mainframe environments. Take advantage of technologies like z/OS Connect to run modern, API-driven applications on mainframes, or Open Data Analytics for z/OS to host modern data analytics workloads on top of your mainframe. You can also deploy Linux containers on your mainframe, allowing you to run distributed workloads on massively scalable and high-performing mainframe infrastructure instead of costly distributed infrastructure.

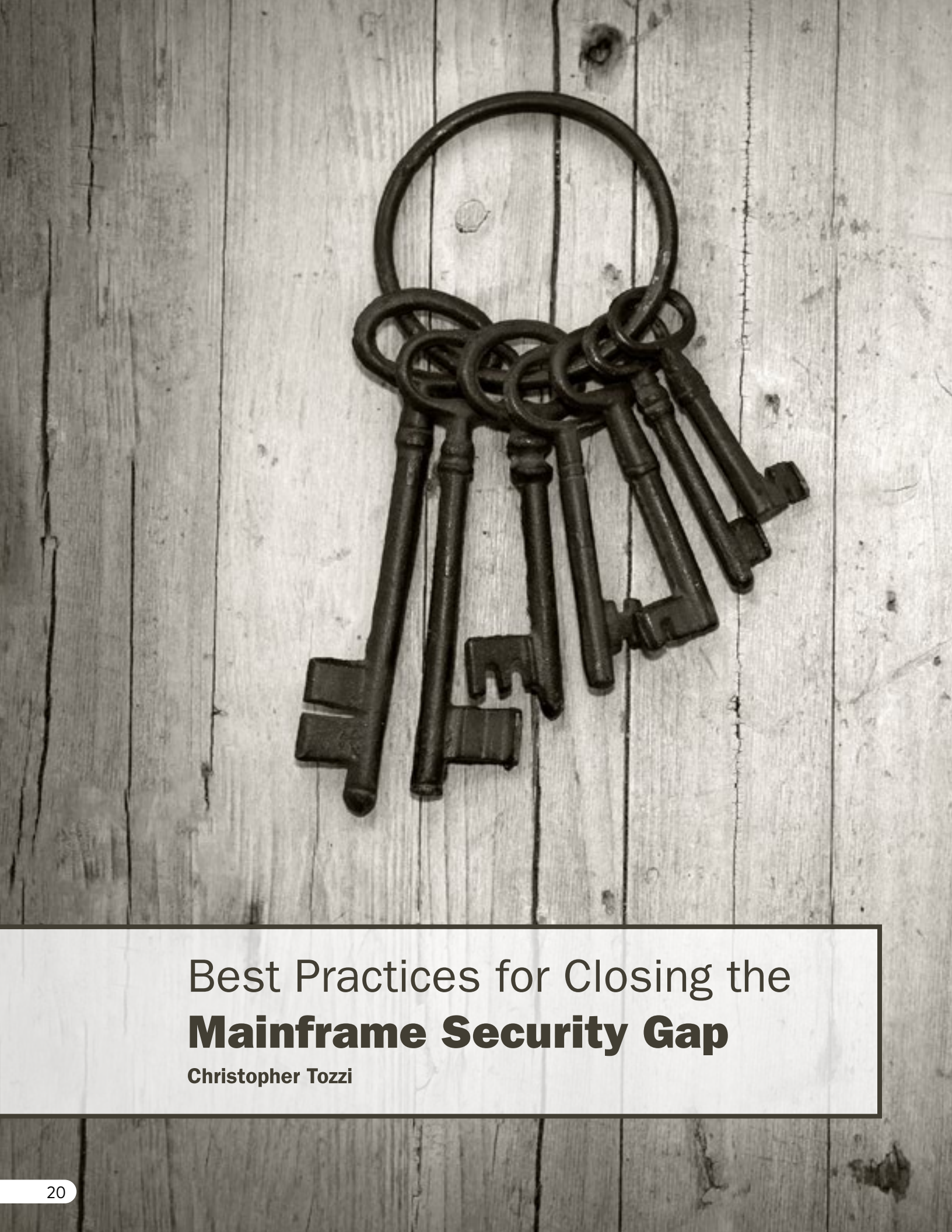
Through strategies like these, businesses can not only maintain, but actually increase the performance and scalability of mainframe systems while simultaneously reducing costs. They get the best of both worlds: Modern application architectures and deployment techniques combined with cost-effective, dense, ultra-reliable mainframe infrastructure.

Enjoy your green grass

Let me close with another analogy: If you find that your lawn isn't as pretty as you'd like, you could go and pave it over with asphalt, or entomb it in astroturf. It wouldn't exactly be an elegant solution, but it would save you from having to look at your yellowing grass.

That approach is akin to moving your mainframe workloads to commodity servers just because you're not happy with the current state of your mainframe. It's not really a good solution; it's a knee-jerk reaction that may seem like a good idea in the short term, but that shoots you in the foot in the long term.

A better approach is to take the steps necessary to modernize your mainframe. Even if you're not pleased with the state of your mainframe today, you can improve it—just like you can water and fertilize a stale lawn to bring it back to its prime



Best Practices for Closing the **Mainframe Security Gap**

Christopher Tozzi

You could argue—as some folks have—that mainframes are inherently more secure than commodity servers because there are fewer variables at play on mainframe systems, making them easier to secure in some ways. The fact that mainframes account for a relatively small portion of the overall computing market is also a security benefit because it means mainframes are a less common target for attackers.

But none of the above means that mainframes are immune from security risks. On the contrary, mainframes are subject to many of the same cybersecurity challenges as x86 servers and the apps that run on them. And because most cybersecurity solutions designed for commodity infrastructure don't support mainframes, admins need to devise special strategies for keeping mainframes secure.

Keep reading for a look at why securing mainframes can be so challenging, as well as best practices for keeping mainframes safe against cyberattacks.

Mainframe security risks

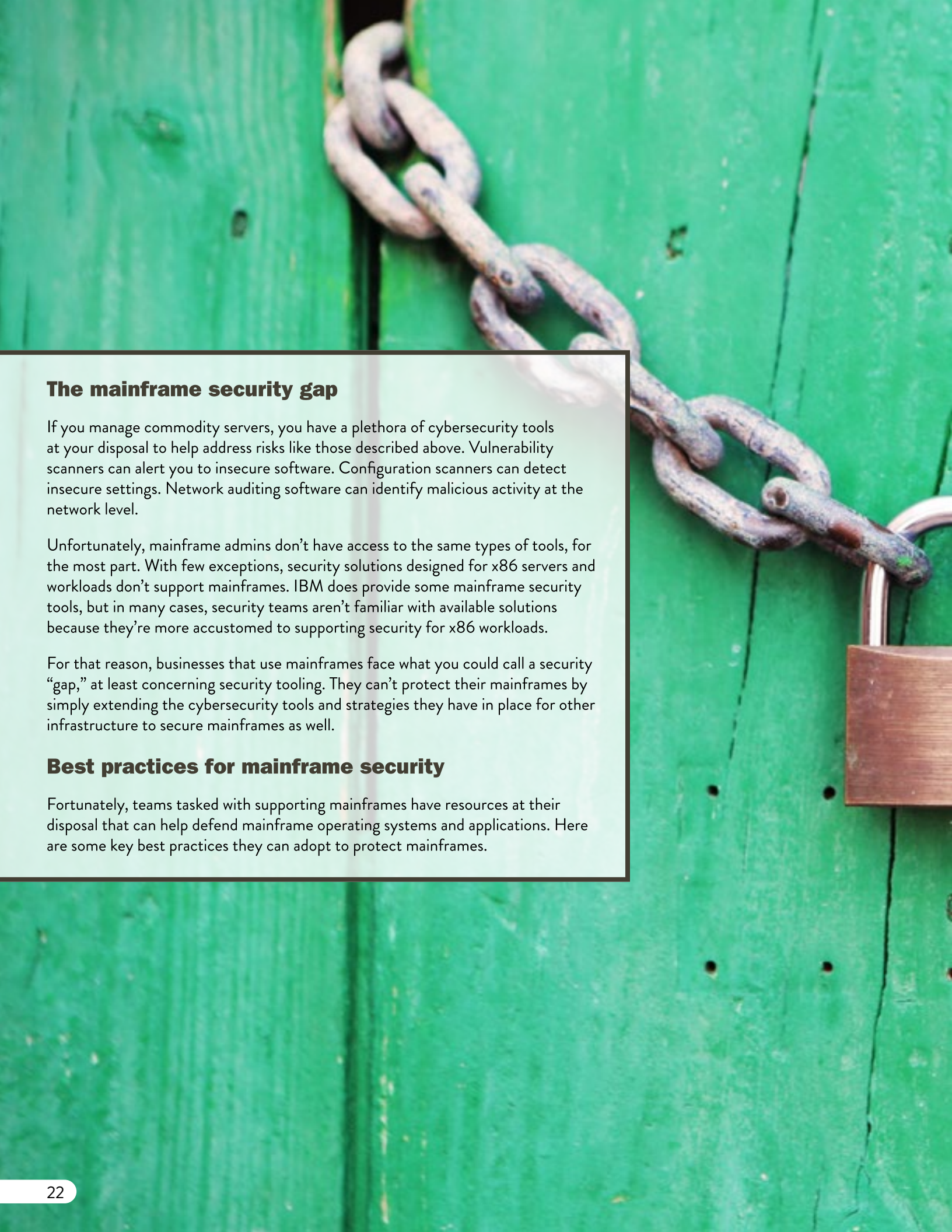
Again, mainframes are arguably more secure than other types of infrastructure because mainframes are simpler overall. There are fewer operating systems, programming languages, configuration options, and so on to contend with in the mainframe world. To be sure, the fact that Linux-based workloads can also run on mainframes means that mainframe configurations can become complex in some cases. But in general, they're simpler than what you'd encounter on an x86 server. By extension, there are fewer places where vulnerabilities can arise, and fewer opportunities for admins to make mistakes that expose mainframe workloads to security risks.

That said, mainframes are still subject to a variety of potential security problems, such as:

- Vulnerabilities in mainframe operating systems (like z/OS), as well as in applications deployed on mainframes. Vulnerabilities result from flaws or oversights in source code that enable attackers to exfiltrate data or abuse systems.
- Weak or improperly configured access controls in mainframe environments could give attackers access to resources that they should not be able to view or modify.
- Malicious actors on networks that mainframes connect to. At the network level, attackers could "sniff" sensitive data as it flows to or from mainframes, or even potentially create backdoors into mainframes themselves by taking advantage of insecure network protocols.

The list could go on, but these threats represent some of the most common security challenges mainframes face.

Mainframe security risks are exacerbated by the fact that many mainframe engineers lack special security expertise, and many security teams have limited familiarity with mainframes. That makes mainframe security different from the world of commodity servers, where security analysts are typically quite familiar with the platforms that host workloads today—like public clouds.



The mainframe security gap

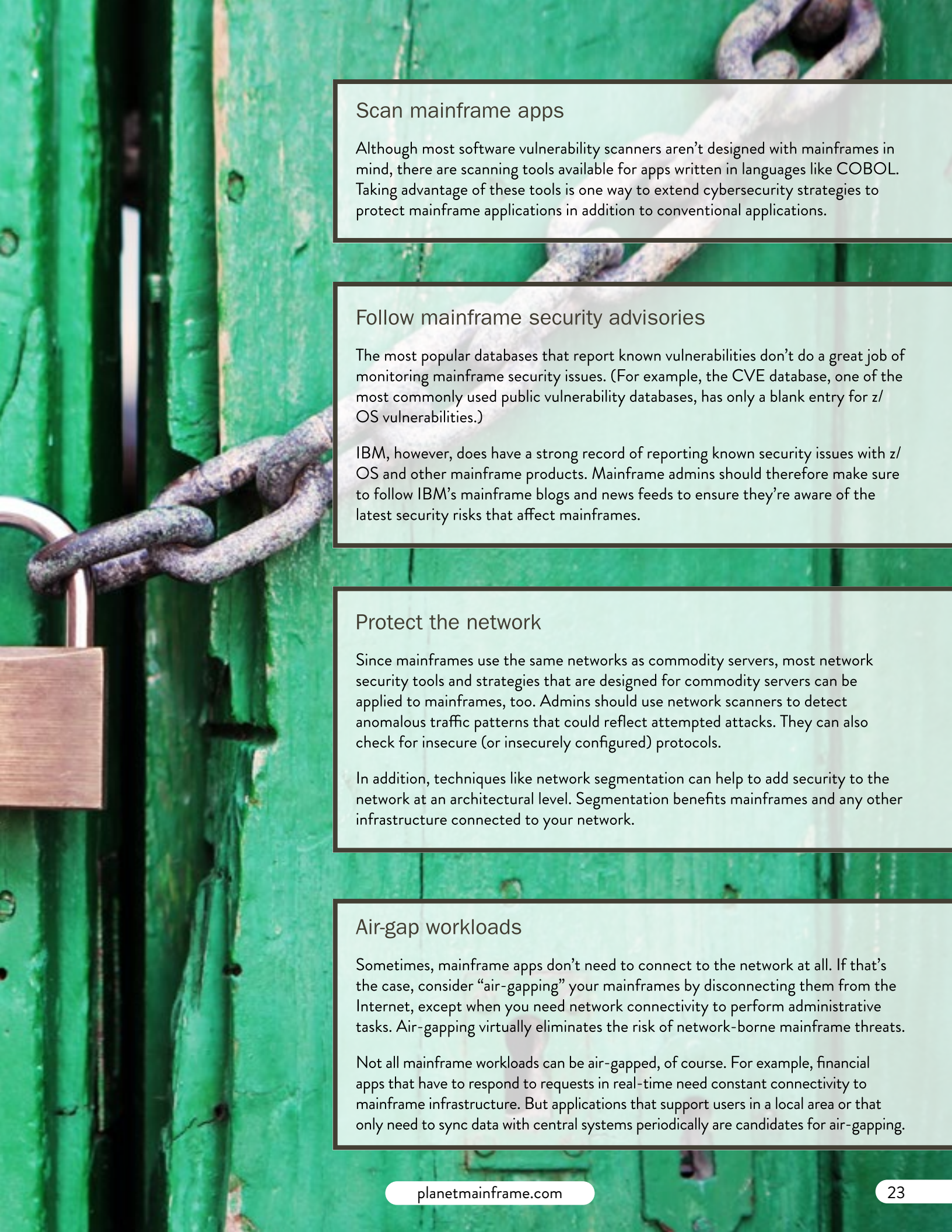
If you manage commodity servers, you have a plethora of cybersecurity tools at your disposal to help address risks like those described above. Vulnerability scanners can alert you to insecure software. Configuration scanners can detect insecure settings. Network auditing software can identify malicious activity at the network level.

Unfortunately, mainframe admins don't have access to the same types of tools, for the most part. With few exceptions, security solutions designed for x86 servers and workloads don't support mainframes. IBM does provide some mainframe security tools, but in many cases, security teams aren't familiar with available solutions because they're more accustomed to supporting security for x86 workloads.

For that reason, businesses that use mainframes face what you could call a security "gap," at least concerning security tooling. They can't protect their mainframes by simply extending the cybersecurity tools and strategies they have in place for other infrastructure to secure mainframes as well.

Best practices for mainframe security

Fortunately, teams tasked with supporting mainframes have resources at their disposal that can help defend mainframe operating systems and applications. Here are some key best practices they can adopt to protect mainframes.



Scan mainframe apps

Although most software vulnerability scanners aren't designed with mainframes in mind, there are scanning tools available for apps written in languages like COBOL. Taking advantage of these tools is one way to extend cybersecurity strategies to protect mainframe applications in addition to conventional applications.

Follow mainframe security advisories

The most popular databases that report known vulnerabilities don't do a great job of monitoring mainframe security issues. (For example, the CVE database, one of the most commonly used public vulnerability databases, has only a blank entry for z/OS vulnerabilities.)

IBM, however, does have a strong record of reporting known security issues with z/OS and other mainframe products. Mainframe admins should therefore make sure to follow IBM's mainframe blogs and news feeds to ensure they're aware of the latest security risks that affect mainframes.

Protect the network

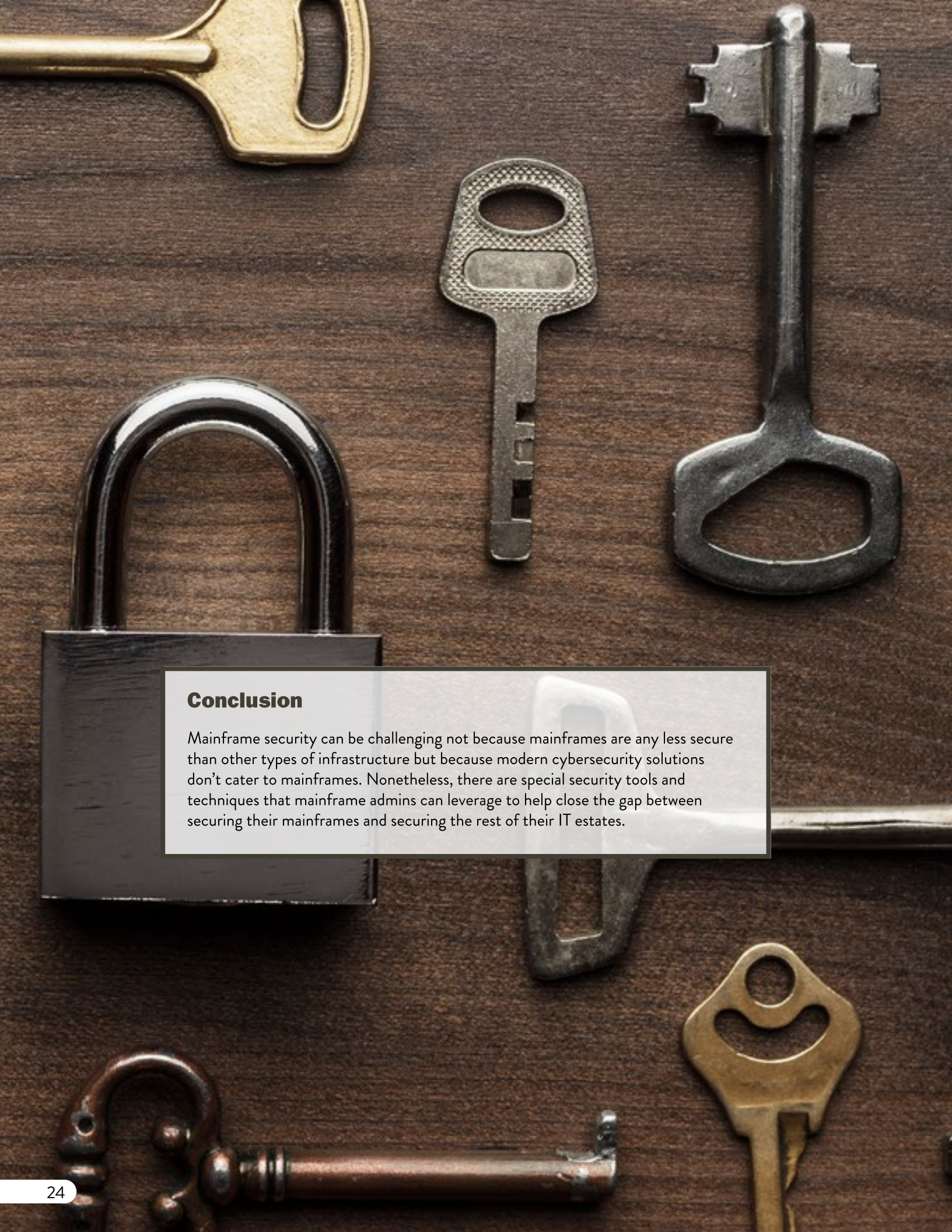
Since mainframes use the same networks as commodity servers, most network security tools and strategies that are designed for commodity servers can be applied to mainframes, too. Admins should use network scanners to detect anomalous traffic patterns that could reflect attempted attacks. They can also check for insecure (or insecurely configured) protocols.

In addition, techniques like network segmentation can help to add security to the network at an architectural level. Segmentation benefits mainframes and any other infrastructure connected to your network.

Air-gap workloads

Sometimes, mainframe apps don't need to connect to the network at all. If that's the case, consider "air-gapping" your mainframes by disconnecting them from the Internet, except when you need network connectivity to perform administrative tasks. Air-gapping virtually eliminates the risk of network-borne mainframe threats.

Not all mainframe workloads can be air-gapped, of course. For example, financial apps that have to respond to requests in real-time need constant connectivity to mainframe infrastructure. But applications that support users in a local area or that only need to sync data with central systems periodically are candidates for air-gapping.



Conclusion

Mainframe security can be challenging not because mainframes are any less secure than other types of infrastructure but because modern cybersecurity solutions don't cater to mainframes. Nonetheless, there are special security tools and techniques that mainframe admins can leverage to help close the gap between securing their mainframes and securing the rest of their IT estates.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ReBoot Hill Revisited

Keith Allingham

Once upon a time, a website existed that recorded some of the most spectacularly failed mainframe migration projects. Of interest to all mainframe type people, I'm sure that it saw a lot of traffic; a Google search on ReBoot Hill yields the website, but it no longer appears operational; the page seems corrupted. Quite a shame, since the stories were really amazing.

Well, as a consultant for a mainframe software company, I saw fit to save some of these stories a few years ago, so I now present them to you for your information and enjoyment. Based on some of the figures cited in several of these stories, it's obvious that some of them are quite old, but the recurring themes are both informative and shocking. Enjoy!

Invested: $200M plus

Organization: Subsidiary of major oil company

Original Plans: To replace their central mainframe system with a full distributed Unix client/server system running SAP applications.

Unanticipated problems: The application implementation period was well over three times the initial estimate and the package costs increased four-fold due to the more powerful servers required even at the pilot stage. The support staff were also increased substantially from the initial estimates with expertise required at each location. The SAP skills required were in short supply forcing the users to pay much larger salaries with a negative effect on the existing staff who left almost 'en masse' before the mainframe systems were decommissioned. Despite the high salaries, most of the SAP skilled personnel moved on after a very short period, causing more disruption and delays. As the application nears completion it is obvious that no Unix server yet built can handle the volumes of the larger sites, and multiple servers just increase response times as the database is distributed still further.

Project Status: The user is re-centralizing and 'porting' the database part of the application back to the mainframe and will ultimately move it back to DB2 as the Unix database being used requires over three times the DASD capacity, and as much as ten times the processor capacity to do the same job. The current cost estimate for the mainframe is under 50% of the Unix cost for a system that didn't even work.

Invested: $25 Million

Organization: Insurance company

Original Plans: To implement an image-based system to reduce paperwork, speed up the issuing of policies, increase availability (there were frequent line problems between remote locations and headquarters reducing availability to around 98%) and allow for a doubling of business with no staff increase. A response time of one to two seconds was crucial to this latter requirement. The distributed Unix-based solutions proposed were all significantly cheaper than the mainframe based ones, even though the insurer had a large mainframe-based system. The IT Department was in favor of a mainframe based solution as it had many reservations about the likely performance of the Unix solutions, and none of the proposed Unix solutions could be demonstrated at anything like the volumes required. However, the promised improvement in availability swung the decision to the Unix platform.

Unanticipated problems: The initial Unix servers were too small to handle the volumes and the overall capacity was quadrupled before the system went live. Performance is adequate when few users are working simultaneously, but as soon as the workload increased the response times increased to anything from 30 seconds to one minute (on occasion, worse than that). It is this erratic response time situation that caused most of the problems as the users get frustrated and even resort to hitting any key on the keyboard and even kicking the system on occasions 'to make it work'. Of course, this just increases real downtime, and overall the availability of the system rarely reaches 90% over a one-month period. As a result, there has been an increase in the time required to issue policies and no business increase can be supported without a large increase in staff.

Project Status: A review is being conducted into moving the application to the mainframe although there are some political hurdles to this approach. The only alternative is to quadruple the investment in Unix servers to provide more capacity, but this would then be far more expensive than the mainframe solution.

Invested: $500M

Organization: Large utility

Original Plans: To replace all mainframe systems with a client/server based Unix/NT solution to improve customer service and enable more rapid applications development to exploit market opportunities in this rapidly changing market. It was also considered that the year 2000 conversion of the legacy applications would be simply 'money wasted.' To ensure success the utility entered into an outsourcing contract to handle everything from the operation of the mainframes to the implementation of the new systems.

Unanticipated problems: Shortly after the project began the outsourcer insisted on a renegotiation of the contract terms, which put more of an onus on the utility to support the new systems locally. The suggestion being that so little support would be needed that local personnel could undertake the required tasks as part of their normal daily routine. However, over time it became apparent that the support requirements of the new system were more than triple those of the mainframe with the mixed Unix/NT environment, causing many problems. At around the same time the mainframe capacity needed to be enhanced as conversion was well behind schedule, but again the outsourcer insisted that this required yet another renegotiation of the contract. These two changes combined to give a new total cost of well over twice the original mainframe costs compared to the 25% reduction that had been expected. The final problem was that rather than experiencing more rapid implementation of new applications, the poor management software and limited development tools had resulted in the average new application taking twice as long as on the mainframe.

Project Status: There is no confidence that the new systems will all be operational before the year 2000, so many of the legacy applications will need converting anyway and the mainframe will require further investment. Consequently, many of the planned client/server Unix applications have been abandoned and the legacy applications will be converted for the year 2000 and also enhanced to become client/server systems interfacing with NT.

Invested: $100M Plus

Organization: Motor Vehicle Licensing Agency

Original Plans: To replace a mainframe system with a client/server system (Sequent/Unix) to "lower the costs of computing."

Unanticipated problems: The application could not support more than 50 users with an 'acceptable' response time of 10 to 15 seconds. With 100 users online this frequently increased to minutes. The supplier, scrambling for some type of solution, actually put data integrity at risk by convincing the customer to remove record-locking protection on updates. Their rationale was that "it's a one in a million chance of two users accessing the same record simultaneously." After this change the response time improved to 10 to 15 seconds for up to 100 users, but still increased rapidly thereafter. The problem is that as they issue around 3 million licenses per year the "one in a million" chance actually occurs about three times per year when duplicate licenses are issued to different vehicles.

Project Status: The mainframe was finally replaced, some three years later than expected, but the user still uses an outsourcing firm to run and maintain their legacy mainframe applications, at a cost close to the original total mainframe cost! The eventual budget for the replacement system was three times the old mainframe budget and six times the anticipated cost. In addition there has been a 50% increase in clerical staff to handle the same volume of transactions.

Invested: $100M plus

Organization: Automobile Insurance Company

Original Plans: To sell and service automobile insurance over the telephone using a low cost Unix application package and a single Unix server. The application was to be expandable as the business grew, eventually supporting up to 1,000 concurrent users at peak times.

Unanticipated problems: The new application could not support more than a dozen users with an 'acceptable' response time of 2 to 3 seconds. The system also crashed almost hourly. Consequently, the application was rewritten and customized for that Insurer. The new application still required multiple Pyramid Nile servers to support a 40GB database and a maximum of 100 users per application with 400 in total. Response times were variable, up to 30 seconds when heavily loaded, and the system still crashed on a weekly basis when heavily loaded.

Project Status: To handle the business growth this Insurer tested every available Unix platform but could not find one to support 750 concurrent users. They installed a mainframe-class system running a proprietary version of Unix to meet this level of use, but still experienced 30-second response times and frequent outages. Their cost per policy has been measured at over six times that of a rival company that was using a S/390 mainframe system.

Invested: $100M

Organization: Retail chain

Original Plans: To replace central mainframe with distributed Unix/NT client/server solution to lower costs and improve profitability through improved stock management. The core of the application was to be a fully distributed database available to all locations online so that customer service could be improved. Overnight queries on sales could be made by marketing utilizing the new database.

Unanticipated problems: Staff querying stock levels at other locations to meet immediate sales requirements of on-site customers or telephone queries effectively 'locked out' local staff from accessing the database to handle on-site customers. The overhead incurred by locking records, making 'phantom' allocations and then backing them out of the system was incredible, and response times often deteriorated to in excess of one minute. A doubling of the original capacity made no impact whatsoever and the opinion of experts consulted was 'no amount of money could resolve the problem with the current level of distributed database software.' Furthermore, there seemed little real likelihood of future enhancements fixing the problem. The actual sales process increased in time and customer satisfaction fell as customers could not get the sales attention they required. In addition, at each location expertise was required to handle the myriad of problems that occurred, which increased costs substantially. The marketing department found that queries were taking hours to process, and quite often one query would lock out another one.

Project Status: The system has been modified to use a central database. Now each location is utilizing a server with their own stock records, which are updated at the central site as stock is received or sold. Queries on availability from other locations now receive a 1 to 2 second response and the time taken for the local sales process has been dramatically improved. All of the Unix servers have been removed from the various locations and the NT servers have been downgraded in some cases. However, at least one of the Unix servers was utilized in the new environment as an extract from the DB2 database is made available at the end of each day for the marketing department to use for their queries. A future move to network computers is expected to improve things further by providing more hardware throughout the stores for no increase in cost.

NO AMOUNT OF MONEY COULD RESOLVE THE PROBLEM WITH THE CURRENT LEVEL OF DISTRIBUTED DATABASE SOFTWARE.

Amount invested: $250m and counting

Organization: Foreign subsidiary of major international bank

Original Plans: This subsidiary was recently purchased by the major bank to provide a presence in a new geographic area. The computer systems were in the process of being changed from a central mainframe system to a distributed Unix Client/server solution to improve customer service and reduce costs. As this project was already underway, the new parent is leaving the plans unchanged at this time.

Unanticipated problems: The Unix servers originally specified (from a variety of vendors to keep them all competitive) were all under-configured by a factor of four to five times. In most cases, this means that there is no system large enough available today. The project team also found that as larger servers became available the later software releases tended to use up the additional capacity without increasing the actual business throughput or transactions. However, probably the single major concern is that the bank is experiencing data loss—especially when something fails. The result is that recovery from a failure can take many days before full integrity can be assured.

Project Status: The corporate head of IT has been charged with making this system work, but currently he does not see how this can be achieved—at any price. His only consolation is that he can very quickly implement their mainframe-based worldwide systems if a real disaster looms.

Amount invested: $100M

Organization: Transport company – Railroad

Original Plans: With the breaking up of what was a national railway, one of the divisions decided to implement all new systems (purchased from another railroad) on a Unix platform to replace the mainframe applications used before the split. The annual costs proposed by an independent software supplier who project-managed the implementation were around half of the estimated costs of continuing to utilize mainframe based systems. So the implementation cost was put at twice the ongoing annual mainframe costs to give a four-year break even point.

Unanticipated problems: The applications from the other railroad required extensive modification to meet the needs of this railroad and also had to be 'tailored' extensively to communicate with the other railroad companies created after the breakup. This increased the implementation time by two years and doubled the planned implementation. Running costs have also doubled as more capacity and support are needed than originally planned. In the interim, the user had to continue running and maintaining the old mainframe systems, which they did through a Facilities Management company that charged 150% of the expected costs due to the short-term nature of the contract. The independent software company went bankrupt leaving the user to pay all of the increased costs.

Project Status: Despite the problems the user is pushing ahead and hopes that there will be no more 'surprises.' They are aware that over an eight-year period rather than reducing costs by 25% in total they will have increased them by around 140%, but there is still a belief that "mainframes are Dinosaurs" and a further belief (or perhaps a hope) that ultimately Unix costs will become lower.

Amount invested: $100 million over several years

Organization: Financial organization

Original Plans: To develop a client/server workflow and imaging system to front-end the mainframe. Create a Sun/Unix environment with >1000 workstations supported by >100 Sun servers running a popular RDBMS for Unix. The investment decision was based on vendor promises of low cost, high availability, and top performance.

Unanticipated problems: The new system and Unix application could not support 100 users, with a response time of 120 seconds being quite common with only 50 users online. With the required 100 users online this frequently increased to 5 minutes and the system became unstable with crashes and loss of data. The user replaced the initial HP Unix system with one from Sequent, but there was only a minimal improvement. The number of support staff had doubled during the 3 years this project was being attempted and the lack of systems management software had caused a number of catastrophic failures with some data lost and never recovered. The true cost of this has never been discovered, but is certainly in the order of $100m.

Project Status: The user decided to scale-back the application and move 80% of its function back to the mainframe, effectively letting the application still do some image retrieval. Plans for scaling back the application also called for the replacement of workstations and GUIs with a thin-client device.

Read the rest of the Stories at

https://planetmainframe.com/reboot-hill

My Great Uncle Was a Farmer so I am a Mainframer

Allan Zander

Why am I a Mainframer? It all started when my great uncle bought a Combine....

When I was growing up, my family and I made frequent trips to a farm on Manitoulin Island in Canada—about 250 miles north of Detroit—a remote place where farming was difficult and few made it big. It was an awesome place. My two great uncles owned farms side-by-side there, and were successful while others weren't. They were chicken, dairy and beef farmers; they also farmed beans and corn for profit, and hay for the cattle. When I was about 13 or 14, they completely transformed their way of farming: they bought a Combine with a massive tractor and wagon. As a teenage boy, this Combine was of great interest to me—I mean, who doesn't love big machines like that? I still have fond memories of that great big Combine, but until recently I didn't realize how my early experiences with farming helped shape my views of the IT world.

Curious about their brand new behemoth-like machines, I asked one of my uncles why they needed them now when they didn't before. My uncle explained that the heavy lifting of farm work- the planting and harvesting- used to be accomplished there with the help of neighbors. Neighboring farmers would help with plowing and planting; same in the fall- everyone would pitch in to help with the harvest, the heaviest of the heavy lifting. Before, they had a small fleet of aging farm equipment- small tractors, single row corn pickers, corn shellers and more – but with a growing farm, they needed to get serious. It was no longer practical for them to continue operating their farms the way they were doing it back then.

Although the crop production side made money, I later came to learn that the dairy side of their business was actually the most profitable. The money from crop production was largely used to fund the dairy operation. While the dairy side of the business had largely fixed costs, there was opportunity to become a lot more efficient on the crop production side. My uncles could have replaced all of their old farm equipment with newer versions of the same type for less than it cost to buy the Combine, but Combines are extraordinary pieces of equipment; they are extremely efficient. Buying this one powerful machine was a brilliant move because it eliminated the need for a lot of smaller machines, and allowed my uncles to do the same amount of work with a lot less help in a fraction of the time. The Combine allowed them to actually grow the crop production part of the business, while leaving them with more time to devote to the dairy side of the business.

I was fascinated by the idea that one machine could help them do so much more, and asked him if there was a way for the combine to do even more of the work on the farm—he smiled and told me that it does plenty already.

So what is my point here? Well, I've come to realize that a Mainframe system does for an IT organization what the Combine did for my uncles' farm. Most people who have looked at the numbers know that the Mainframe is the most operationally-efficient platform to run, and is actually more cost effective than other computing solutions. Like the Combine on the farm, the Mainframe in the datacenter does the work of many smaller machines, gets the hard work done faster, and is cheaper to run. But more than that, Mainframe systems allow IT organizations to maximize revenue by very efficiently handling the tough IT jobs (like transaction processing), and by making sure that the work happens reliably 100% of the time.The farm's combine isn't suitable for driving to the feed store or pulling a truck from the ditch—you could use it for those tasks- you just wouldn't; but it is perfect for the hard, heavy-lifting work. You could probably use many smaller vehicles to do the hard work on the farm, but you just wouldn't. Similarly, the Mainframe isn't suitable for doing some of the smaller things in a datacenter—like inventory control or CRM, but it is the best machine available to do the hard work for large IT organizations—like high-intensity transaction processing, and growing business workloads. And it doesn't make sense to use racked commodity servers for that type of work.

The Combine changed my uncles' farming business. By saving time and money on crop production, they were able to invest more time and money into their dairy business, which ultimately allowed them to transform their farm operation into one of the larger dairy farms in that part of Canada. Without Combines to do the heavy lifting, they couldn't have grown their business to that extent. Mainframe systems make it possible for businesses to run their most intense business operations quickly and cost-effectively, allowing the saved time and money to be invested in new IT assets (some of which will run on those same Mainframe systems) that in turn help transform a business to something more. Without the power and efficiency of the Mainframe, growing businesses might not be able to fund vital transformations.And that, in part, is what has driven me in my role as CEO of DataKinetics. Back then, I asked my uncle if there was a way for the Combine to do more, and now we're focused on providing ways to help IT organizations to do more with their Mainframe systems. Today the Mainframe accounts for $10.55 of revenue for every dollar spent on it; compare that to $8.22 for distributed computing systems—and we help to significantly increase that Mainframe revenue figure.

Now, to be honest, I would be one of the first in the room to admit that not every company needs a Mainframe, just as not every farm needs a Combine. But they are both critically important for growth—large growing farms need Combines, and large growing businesses need Mainframes.

Why you need to protect your business with *IBM Z Cyber Vault*

Nathan Brice

It seems like every week there is a new story of a major company or organization being affected by a cyber-attack. It might be a ransomware attack, stolen user data, or other disruption to services, and may be initiated either by an external attack or internal malicious actors. Whatever the attack vector and motivation, we are clearly living in a world where there is an increasing risk to the services we rely on in our daily lives.

According to the IBM Cost of a Data Breach Report 2022, 83% of organizations studied in the report have experienced more than one data breach. The average cost of a data breach was $4.35 million, up 12.7% from the data in the 2020 report. For critical infrastructure organizations in financial services, industrial, technology, etc the cost is even greater at an average of $4.82m. In addition to the immediate monetary costs, the impact on brand image, potential lawsuits, and loss of customer data can be very significant.

While attacks are becoming more prevalent and costly, insurers are pulling back on coverage of such events. A new report by Delinea showed that only 30% of organizations said their policy covers critical risks such as ransomware, ransom negotiation, and decision on ransom payment. 47% of respondents stated they were required to have malware protection, antivirus software, multi-factor authentication, and backup data in place to qualify for cyber insurance.

Most industries are now moving toward a Zero Trust framework with technologies such as Multi-Factor Authentication, Endpoint Monitoring, and Full-Disk Encryption becoming prevalent. This will help reduce the risk of a successful cyber-attack, but what happens when your defenses are breached?

The IBM Z Cyber Vault solution takes a holistic approach to help you identify and rapidly recover from a cyber-attack if one affects your business. Regularly creating tamper-proof backups that are stored in a secured, isolated environment provides the ability to recover your business in the event of a data breach. The IBM Z Cyber Vault solution delivers protection via 5 key use cases.


The average cost of a data breach was **$4.35 million**, up **12.7%** from the data in the 2020 report.

Data Validation

The first step in protection is to ensure that backups taken are not corrupted. On a regular cadence, a copy is taken of your production environment and then this copy is validated in an isolated environment. Type 1 validation ensures that one or more system can be started successfully. Type 2 validation ensures all running software can be successfully started and tools or utilities are run to validate that the structure of the data has not been compromised. Type 3 validation validates the specific application data content. If issues are found at any stage, this is an indication that your production system has been affected. If a copy passes validation, it is an indication that all prior copies are good.

Forensic Analysis

Once you have identified an issue, a copy can be snapped off for immediate analysis. Any of your secured backups can be started in an isolated environment and used to investigate the problem and determine the recovery action. If, for example, the corruption event was at 2 pm you can restore the last known good backup before that time to compare to the current environment.

Surgical Recovery

Once the specific recovery action plan is decided, any required data can be extracted from the secured backup copy and restored back into production. Any row, file, or data set can be recovered in a surgical recovery to ensure that you are only recovering what has been affected and leaving the rest of the production system intact.

Catastrophic Recovery

In rare cases, you may have lost your entire production system. In this case, fixing the production environment with a surgical recovery will not be possible. In this scenario, it's important to be able to recover your entire environment from your last known good backup.

Offline Backup

In addition to the backups kept on disk, it's also important to support the ability to archive these copies out to an offline media, typically a tape environment.

An IBM Z Cyber Vault solution can support all 5 of these use cases for maximum resiliency. We are seeing a tremendous amount of interest in this exciting new technology and believe that eventually most of our clients will deploy this type of solution. If you would like to learn more about IBM Z Cyber Vault you can download the Red Book, or contact me or one of the other IBM experts.

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Our aim at *Planet Mainframe* is to connect. We believe you feel the same. In a world where people are inundated with information, people are looking for an online community where they can share their insights. *Planet Mainframe* is a platform built for a community that champions different perspectives and revels in having their voice heard. At *Planet Mainframe*, we value your mission for brand education. We desire to be of service to you by showcasing your brand.

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We are mainframe enthusiasts and IT professionals. More importantly, we are a friendly community.

Monthly Visitors

5,500

Monthly Pageviews

13,000

Published Articles

400+

Active Since

2017

Geography

Top Globally

United States of America	**28%**
Europe	**27%**
APAC	**36%**

Europe Breakdown

Germany	**34%**
France	**14%**
United Kingdom	**13%**
Netherlands	**4%**
Spain	**4%**
Sweden	**4%**
Italy	**3%**
Belgium	**3%**
Denmark	**3%**
Poland	**2%**

Audience Demographic

Industry

IT Services and Consulting	**25%**
Software Development	**20%**
Business Services	**5%**

Business Size

10,001+	**26%**
5,001–10,000	**7%**
1,001–5,000	**9%**

Seniority

CXO	**4%**
Senior	**47%**
Director	**4%**
Manager	**4%**
Entry	**14%**

Advertising Placements

Homepage

In-Article

Leaderboard	
Site header	**$500**
After 2nd article paragraph	**$450**
Footer	**$350**
Right Side Bar	
Tall Skyscraper (Above Fold)	**$650**
Medium Rectanlge (Above Fold)	**$400**
Tall Skyscraper (Below Fold)	**$650**
Medium Rectanlge (Below Fold)	**$400**
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- Right side banner
- White paper listing

for **3 months**

Silver Tier

- Sponsored Article
- Leaderboard
- Right side banner
- White paper listing

for **3 months**

Gold Tier

- Leaderboard
- Right side banner
- White paper listing

for **12 months**

Platinum Tier

- Sponsored Article
- Leaderboard (1 premium option)
- Right side banner
- White paper listing

for **12 months**

For more information contact us.
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