Your Choice of OS and Platform Makes a Difference

SEPTEMBER 2024

"87% of ransomware attacks are targeted against Windows, with another 7% targeting macOS."

Q-SEC

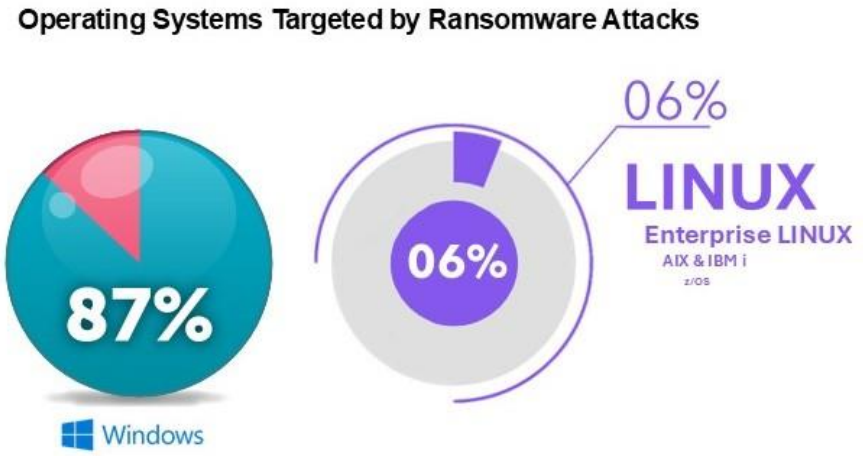
Not all platforms are created equal. We are going to take a look at different Server Hardware and Server Operating System (OS) combinations that are optimal for Security and Availability based on statistics gathered by ITIC of customer experiences with an eye on value for performance.

Raise your hand if you would like to know what the best platforms are for running your workloads securely, with the least amount of downtime, while at the same time reducing software costs by getting more efficiency out of the system.

For an added bonus, we look at the Life Cycle of a solution, and how to calculate the Total Cost of Ownership (TCO).

Operating Systems Targeted by Ransomware Attacks

Based on a 2020 Study, 87% of ransomware attacks are targeted against Windows, with another 7% targeting macOS. That leaves Linux, Enterprise Linux, AIX, IBM i, and z/OS to share the remaining 6%. Of those, the most targeted are represented approximately by the font size.

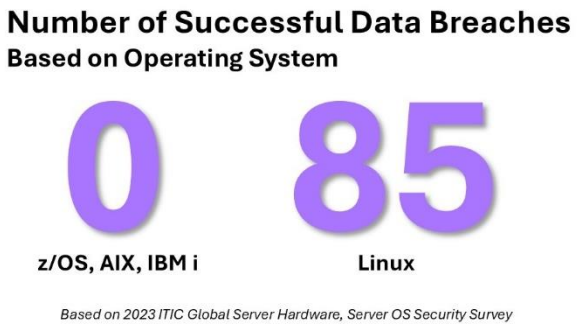


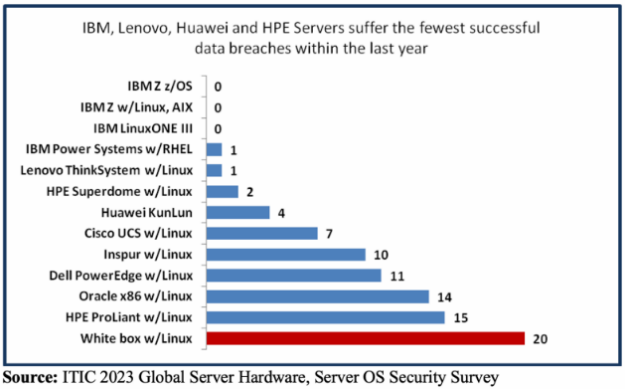
It is not a surprise. Inherently by design as you move from the left to the right and then down the decreasing font sizes, these OS are more secure. Additionally, the underlying platform is a factor as well, going from x86-based, to IBM Z.

It is like a boat, are you more safe in the one with thousands of patched holes or the one that has a single drain plug that you can easily monitor.

Successful Data Breaches & The 6%

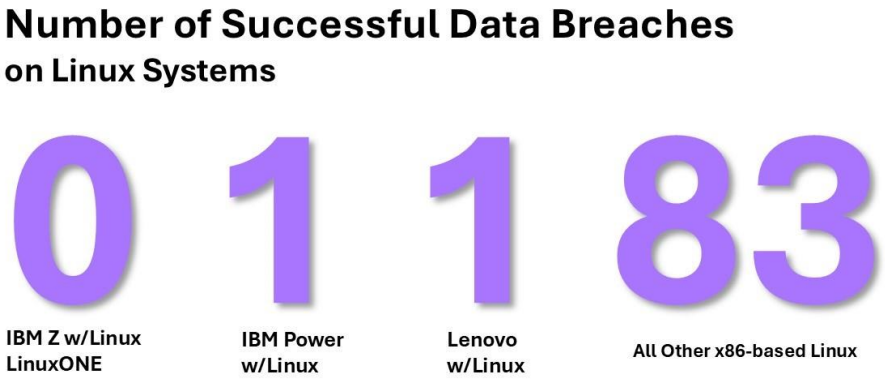
Let's set aside Windows and focus on the right side of the chart, the 6%. Based on a 2023 ITIC Global Server Hardware, Server OS Security Survey (right), there have been a total of 85 successful data breaches on Linux systems as compared to 0 for AIX, IBM i and z/OS combined.





Source: ITIC 2023 Global Server Hardware, Server OS Security Survey

Based on platform, there was 0 successful data breaches on LinuxONE and IBM Z systems with Linux. There was 1 each for Linux running on IBM Power and Lenovo. All remaining successful data breaches where on other x86-based systems running Linux.

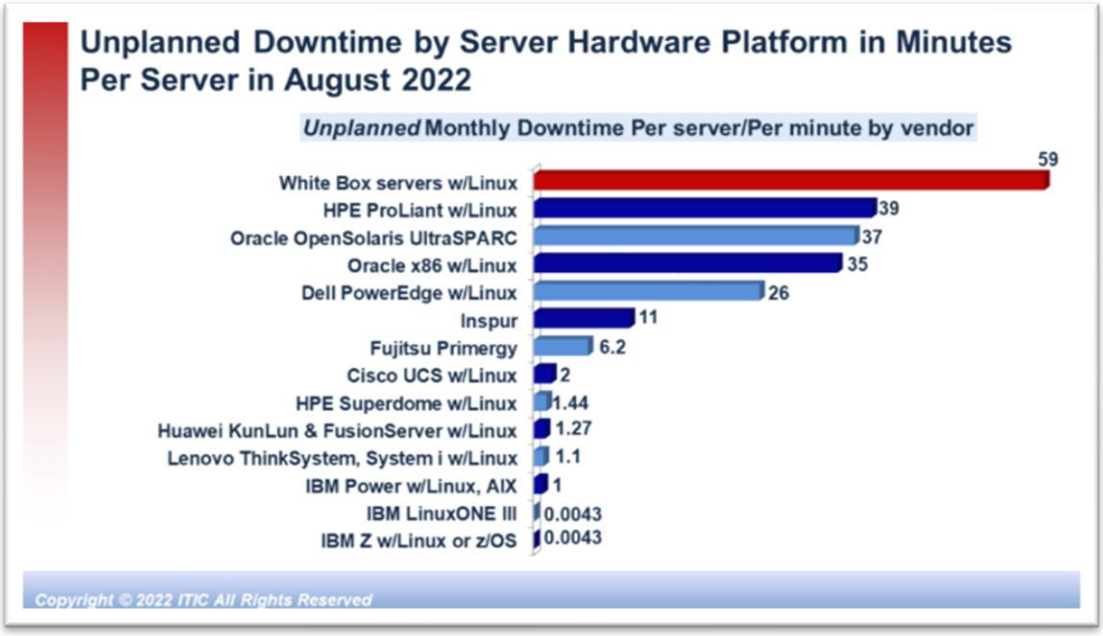


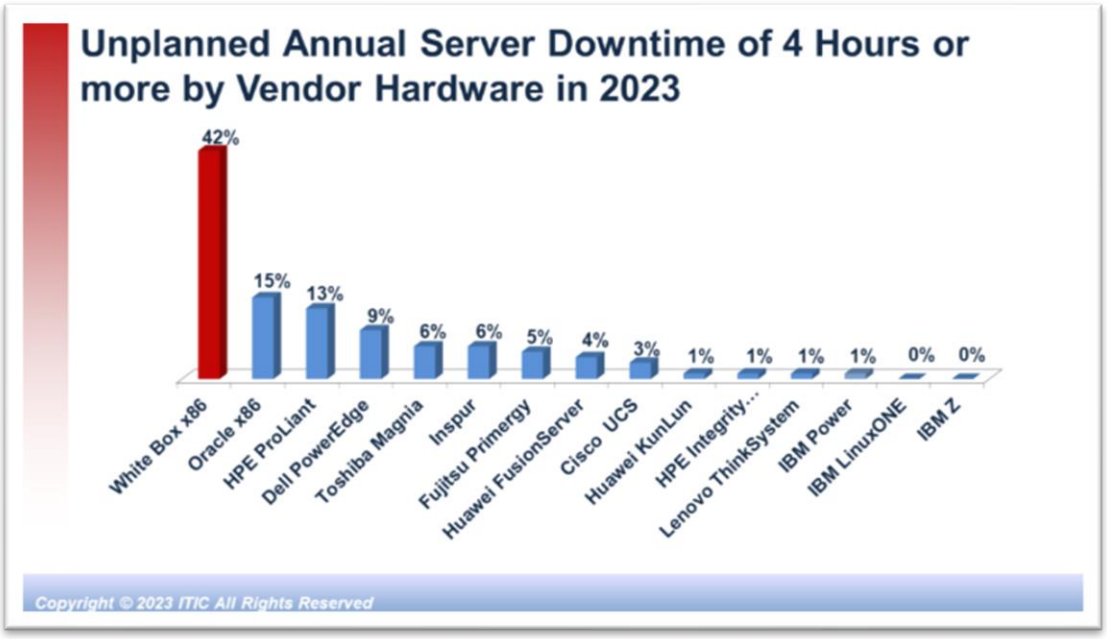
Based on 2023 ITIC Global Server Hardware, Server OS Security Survey

Why this matters, the average Cyber Attack takes 3 weeks to recovery from and costs $4.8M USD.

Server Hardware Availability

We are more concerned about unplanned downtime. You can't plan for it, so it impacts system availability, the availability of the service and ultimately drives a cost associated with the outage. These are two ITIC Studies, the first graph is Unplanned Monthly Downtime by Server Hardware Platform in Minutes Per Server (2022), and the second graph is Unplanned Annual Server Downtime of 4 Hours or more by Server Hardware Platform (2023).





#1 is IBM Z and LinuxONE with just 4.3 milliseconds on average of unplanned downtime per month based on all the customers serveyed, and 0% of those surveyed reported an unplanned outage of 4 or more hours.

#2 is IBM Power running either Linux or AIX with 1 minute on average of unplanned downtime per month, and just 1% of those surveyed reported an unplanned outage of 4 or more hours.

#3 is Lenovo running Linux with 1.1 minutes on average of unplanned downtime per month, and just 1% of those surveyed reported an unplanned outage of 4 or more hours.

In contrast, Oracle x86 running Linux was reported to have 35 minutes on average of unplanned downtime per month, and 15% of those surveyed reported an unplanned outage of 4 or more hours.

Security & Availability Summary

Based on the Security and Availability discussed above, the most secure and available platform is IBM Z running either z/OS or Linux or LinuxONE. Second, is IBM Power running AIX, closely followed by IBM Power running Linux. Third, is Lenovo running Linux. IBM Z and LinuxONE are king in the enterprise world and unmatched for their ability to consolidate workloads, while IBM Power is a direct competitor to x86-based solutions in the distributed systems market.

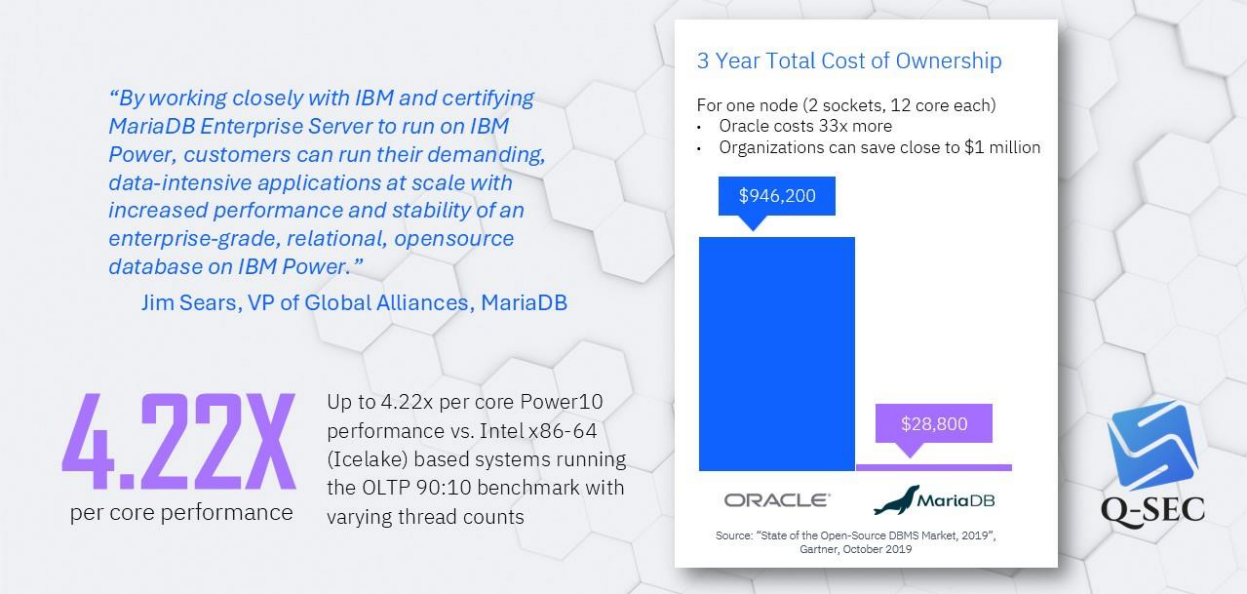
"The average Cyber Attack takes 3 weeks to recovery from and costs $4.8M USD"

Performance on Power vs x86

Why is performance so important you may ask. Well, many software products charge per processor core, and software costs can be even more significant than the cost of the Server Hardware itself. So, the more work you can get done per core the less you pay for the application software.

First of all, the IBM Power processor core typically out-performs an equivalent generation x86 core 2:1. On top of that with IBM Power's hardware-based hypervisor, PowerVM, the system is guaranteed to achieve average utilization of 80% and does not encounter severe issues, other than response time, if it were to hit 100%. Conversely, x86-based systems can, at best, hit 40% average utilization even with virtualization software like VMware deployed. That is another 2:1 factor, giving IBM Power processor cores approximately a 4:1 advantage. That is without taking into account other workload consolidation advantages that help to reduce the core count, like Processor Pools and the benefits realized with Statistical Multiplexing, the effects of consolidating many workloads together.

For example, deploying MariaDB on IBM Power running Linux yields up to 4.22 times per core more performance than an Intel x86 server.



Not only can you save software costs by deploying MariaDB on IBM Power rather than x86, but you can also save by deploying an opensource database like MariaDB rather than a more expensive proprietary relational database like Oracle.

"Organizations can save close to $1 million"

Database Software, Opensource vs Proprietary

Food for thought,

Why would I deploy an expensive proprietary relational database on a commodity server with an opensource operating system?

Why wouldn't I deploy an opensource database like EnterpriseDB or MariaDB instead?

Approximately 80,000 joint customers of IBM and Oracle run their Oracle Database on IBM Power with the AIX operating system. There was a time when Oracle supported their database on Linux on Power as well. Eventually this was withdrawn, and mostly because if you are going to run it on IBM Power why wouldn't you deploy it on AIX. As discussed previously, IBM Power with AIX has Zero Successful Data Breaches to date and is the most available distributed server environment on the planet with an average of just 1 minute of unplanned downtime per month.

With a 4:1 performance advantage over x86, the Oracle Database cost savings can more than pay for the IBM Power System infrastructure.

If you are going to run Linux, why not go with an opensource database as well. Run MariaDB or EnterpriseDB on Lenovo or consolidate and save on Linux on Power.

Linux on Power Advantage

Consolidate and save with Red Hat OpenShift on IBM Power vs x86. Sure, the server may cost you twice as much, but you will save with that per-core performance advantage with the deployment of OpenShift. Where it really kicks in though, is when you deploy an application in OpenShift. Again, with that per-core performance advantage, an application like WebSphere Application Server Hybrid Edition can more than pay for the infrastructure with the software licensing savings.

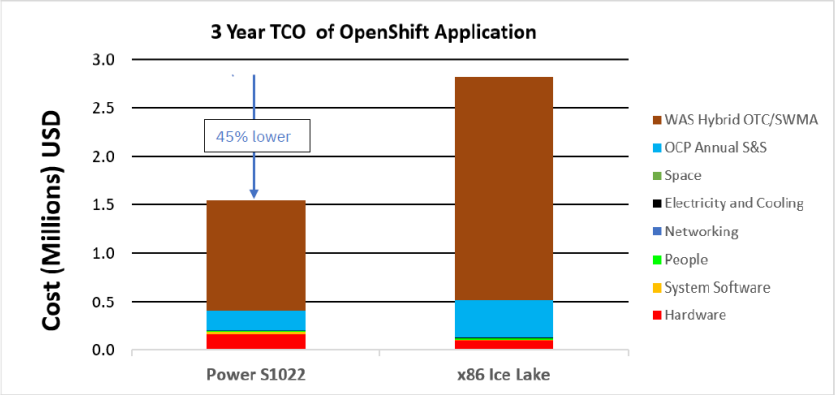


Figure 3: Total cost of ownership for Red Hat OpenShift application on Power10 and x86 Ice Lake servers

Life Cycle & TCO

Customer focus on either a 3 or 5-year Total Cost of Ownership (TCO), when they actually keep the systems for about 10 years. I know this is true for IBM Power, and I believe that x86 systems are kept longer than planned as well. Actually, x86-based systems have a life span of 4 to 5 years and IBM Power on the other hand is 8 to 10 years, about twice as long as x86.

The whole idea of TCO, you guessed it, is to look at that Total Cost of the environment over its complete Life Cycle (i.e.: Ownership). So, you shouldn't be surprised that you need to invest in new infrastructure at the end of the Life Cycle. Also, TCO analysis should be 5-years for x86-based solutions and 10-years for Power-based solutions.

Imagine, in the OpenShift example above, if the TCO was more appropriately calculated over 10 years. The x86 infrastructure would be replaced once during that timeframe, putting the cost of the infrastructure itself on par.

For an added bonus, Total Cost includes all costs of the solution, like what is shown in the above OpenShift example. It is not just the Server Hardware and Server OS, it is also the Virtualization, Application Software, Availability Software, Security Software, Networking, Storage, and Systems Management.

You may want to also consider the cost of downtime and the cost of a data breach.

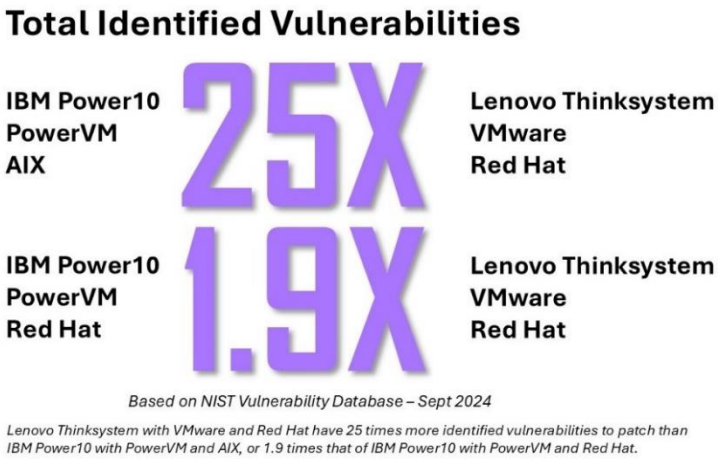
Security, Availability & Performance/TCO Summary

Second only to IBM Z and LinuxONE, IBM Power running AIX or Linux is the most Secure and Available platform, and with a per-core performance advantage the resultant cost savings from application software yields the best Total Cost of Ownership (TCO) compared to x86-based systems. Although there is an advantage to consolidating opensource databases on Linux on Power, your third choice would be opensource databases on Lenovo running Linux.

Systems Management

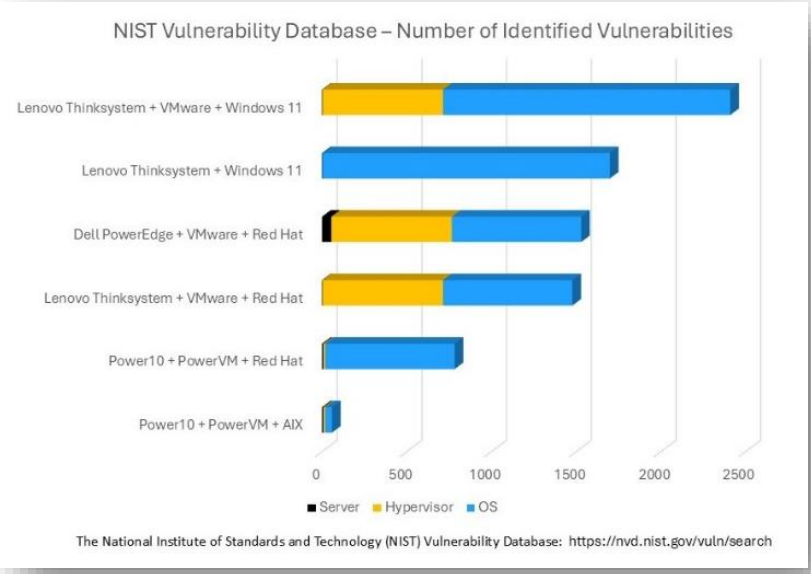
To get an idea of how much effort is required to manage these systems, let's take a look at how much these systems need to be patched for known vulnerabilities. The National Institute of Standards and Technology (NIST) Vulnerability Database can be used to search products in order to get a list of identified vulnerabilities.

I've combined identified vulnerabilities for the platform, virtualization layer, and OS.



For example, Lenovo Thinksystem with VMware and Red Hat have 25 times more identified vulnerabilities to patch than IBM Power10 with PowerVM and AIX, or 1.9 times that of IBM Power10 with PowerVM and Red Hat. The following bar chart provides a few more combinations including Windows 11, and Dell PowerEdge as a server.

This is just one factor to consider. In addition to the ITIC unplanned outage statistics, another indicator is Mean Time Between Failures (MTBF). MTBF, if you can get it, provides an idea of how often parts need to be replaced. Systems that encounter a higher degree of unplanned outages are likely having more parts replaced, however, parts can also be replaced during planned outages if one is able to detect and predict a failure before it happens.



Conclusion

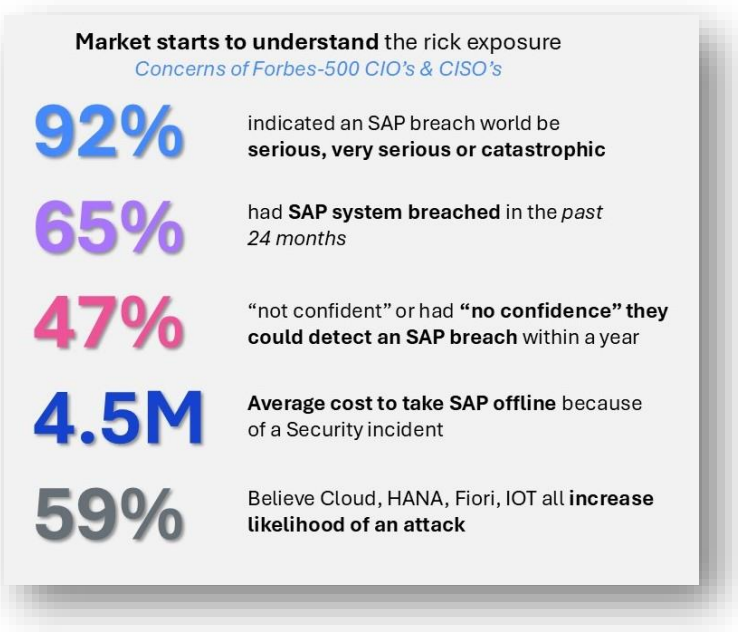
Not all platforms are made equal. You probably don't want to be running anything mission critical or storing any sensitive data on Windows. Enterprise Linux is a great alternative if you are looking for significantly improved security and reliability. It you are not in the market for IBM Z or LinuxONE, a rock-solid environment that will elevate your security, reliability, while managing sensitive data with the least risk, IBM Power is your best choice be it Linux or AIX.

Application Availability

I hear this all the time, *the choice of OS and platform is dependent on application software availability*. In other words, is the application that I want to use supported by that application vendor on your system. Well, application vendors provide support based on demand. Sometimes you need to tell the software vendor where you want to run it.

There is support for thousands of applications on IBM Power, be it Linux, OpenShift, AIX or IBM i. As your essential back-end environment for critical data, support for all the popular data-related software applications, like; IBM DB2, Oracle Database, opensource Databases, SAP HANA, and EPIC are available.

IBM DB2 was developed on IBM Power and ported to OS/2 and later Linux. Still to this day the best place to run DB2 is on Power and it can be run on AIX, Linux or OpenShift. Oracle Database, as discussed, is perfect for IBM Power/AIX. You can easily save on software licensing by consolidating either or both of these relational databases on Power.



Another key application is SAP HANA. In fact, SAP HANA customers are quickly adopting IBM Power, with over 4800 clients and growing. Ranked #1 for availability and offering the largest scale up capacity, customers understand that IBM Power reduces their risk of a system breach. The icing on the cake is getting a "137% ROI and 7 months payback" – *Forrester TEI study*.

There is no one system that fits all but choose the server infrastructure that meets your needs.

"SAP HANA customers are quickly adopting IBM Power, with over 4800 clients and growing."

I hope you enjoyed this discussion and get a sense for why so many clients are utilizing IBM Power today. The latest IBM Power10 servers have been one of the most successful in the entire history of the brand. No wonder clients who deploy Power see it as a competitive advantage. Don't hesitate to reach out to me to find out more about IBM Power Systems and how you could benefit from it.

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