CLABBY ANALYTICS

Research Report

Why Migrate to POWER9: The Business Logic

Executive Summary

IBM's Power Systems group has seen seven quarters of consecutive growth. This steady growth has largely come from systems upgrades; growth in multicloud expansion; and net new business wins (especially related to growth in SAP HANA in-memory servers and the creation of specialized accelerated systems).

Still, some IBM Power System customers have chosen not to migrate from POWER7 or earlier Power Systems designs to newer, POWER9-based servers. Their reasons for not migrating range from "if it ain't broke, don't fix it," to "other more important priorities," to "cost constraints."

The "ain't broke" argument is a testament to the reliability of the older Power System models – and it's hard to argue with the logic that if a device is performing its task well, then why migrate. (It is the secure, reliable nature of Power System servers that often lead Power System executives to push other priorities before server migration.) Still, this argument is faulty, because running older systems that are no longer serviced or supported by IBM as of September 2019, creates a maintenance risk as well as constrains system growth – and risks misalignment with other important business initiatives.

With respect to the "other, more important priorities," Power Systems buyers need to consider whether upgrading older systems will deliver benefits that are more closely aligned with existing business priorities (such as cloud computing, enriched security, application modernization and more.) Power Systems buyers who have upgraded have been able to add more capacity; reduce complexity and lower management costs through server consolidation; and process more work thanks to much more powerful POWER9 processors.

The "cost constraints" argument is the weakest of the three reasons for not upgrading to newer POWER9-based servers. By consolidating a group of POWER7-based servers onto a single, larger, greater capacity POWER9-based system, a typical POWER7 customer might see hardware, software, maintenance, support and energy costs drop to almost a quarter of the cost of running multiple, older generation servers.

In this *Research Report*, *Clabby Analytics* reviews the factors at play when considering whether and when to migrate to POWER9. With service and support having ended on POWER7-based servers – and

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with cost savings now available on the current POWER9-based models, now may be the ideal time for POWER7-based systems customers to consider moving up to the greater capacity, more powerful, more secure POWER9-base alternatives.

Why Upgrade? Higher Performance, More Capacity, Expanded/Enriched Security

By way of technical comparison, POWER9-based servers offer double the performance of POWER7-based servers (which were released back in 2010). Further, POWER9-based servers offer 8X the I/O bandwidth, and 3X the memory bandwidth. POWER7 customers who have needed increased computing capacity have found upgrading to POWER9-based servers to be a "no-brainer," especially when considering the cost savings in performing such a migration.

As compared with POWER8, POWER9-based servers offer twice the I/O bandwidth and 20% more memory bandwidth. POWER8 customers who upgrade to POWER9 have done so to take advantage of more efficient processor communication (thanks to faster I/O and accelerated bandwidth); 4X the maximum memory (more memory capacity); faster I/O (with PCIe Gen4 which has made room for faster accelerators); faster and more compact storage; and improved cost (especially in software licensing).

It is fair to say that Power Systems buyers who have upgraded from POWER7- and POWER8-based systems have largely done so to take advantage of the better performance and greater capacity of POWER9 system designs. It should also be observed that, over the past year, customers who have upgraded have tended to purchase larger Power Systems to process more work (for instance, processing large, in-memory databases like SAP HANA); to consolidate even more servers; and to add new application workloads.

System security also plays a strong role in the decision to upgrade. IBM differentiates its Power Systems by offering significantly differentiated qualities-of-service (QoS) as compared with x86-based servers. Security threats continue to evolve and clients need the latest security to help keep their data safe. Power Systems provides a single source, integrated security solution that covers all levels of the stack (hardware, firmware, hypervisor, OS, etc.) IBM also offers PowerSC software to help administrators closely manage system security. Furthermore, note that PowerVM is the only hypervisor amongst its major competitors with no reported security vulnerabilities. And IBM reinforces security of cloud environments by only executing verified images across all layers, from processor to the OS.

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Other Factors Driving POWER9 Server Migration/Adoption

Net-new business opportunities have surged for Power Systems over the past two years – largely due to very distinct, huge advantages in Power Systems designs as compared to x86 server designs. With very large in-system memory as compared to x86 opponents, Power Systems SAP HANA in-memory database deployments have grown to 2500+ customers over the past three years. IBM's Power Systems organization has proven that POWER microprocessor architecture (POWER8 and POWER9) is superior to x86 architecture when it comes to processing large databases and Big Data due to more addressable memory, more memory bandwidth, faster input/output bus speed, the clever use of GPU accelerators and denser cores with higher throughput per core.

Likewise, the Power Systems group has worked with external makers of accelerators (NVIDEA, for example) – creating unique, purpose-built systems for training AI models that, when combined with direct access to system memory (using CAPI and NVIDEA's NVLink) create highly-optimized accelerator systems. Not long ago, the Power Systems group announced a Power Systems/NVIDIA system design aimed at executing pattern extraction analytics workloads faster than ever before. In this particular design, NVIDIA GPUs are linked with IBM POWER processors over a PCIe bus. Work that can be executed more quickly on a GPU is assigned to the NVIDIA processor; work that can be executed more quickly on the POWER processor is assigned to it. The resulting system accelerated the processing of various technical computing workloads – and is especially effective at processing pattern extraction workloads.

Consider Alignment with the Hybrid Cloud

Back in 2010, when POWER7 was released, there was little industry discussion of multicloud and hybrid cloud deployment as businesses were focused on understanding the benefits of cloud computing and deploying internal on-premise clouds. Now, nine years later, businesses understand the differences between public, private, multi-cloud and hybrid cloud environments – and are now actively engaged in blending their mission-critical systems with their lesser priority public cloud environments. Given this market shift to hybrid clouds, POWER7 users need to determine whether their POWER7 workloads now belong on cloud-modernized POWER9 servers.

When considering a move to the cloud, POWER7 executives need to understand that IBM has four distinct approaches to blend Power Systems with public, private, hybrid and multi-cloud environments:

Transform for the cloud – this approach focuses on application transformation by exposing assets application program interfaces;
Cloud native experience – making it possible to develop cloud applications on Power Systems with no special skills required – as if Power Systems were just like any other cloud development platform;
Private cloud – Manage and leverage Power Systems through integration with hybrid cloud environments from behind the firewall; and,
Public cloud – using IBM servers managed by IBM in the cloud.
IBM's cloud mission is to "provide open access and extend the platform value with open standards and tooling across all cloud deployment and service

models." What this means is that IBM is working to enable its servers to play seamlessly with other vendors' cloud implementations in public, private, traditional, open and hybrid cloud environments

It should also be noted that the Red Hat acquisition plays a key role in IBM's endeavor to become the vendor to turn to when building hybrid enterprise clouds. To build hybrid clouds, IBM intends to position OpenShift cloud technology as the industry standard for open and multicloud environments. OpenShift will serve as a bridge technology that will enable workloads to be run anywhere in a cloud (OpenShift is already supported by Red Hat, AWS, Microsoft Azure, and the Google Cloud.) IBM is also working to make its solutions (its software offerings that include security, databases, middleware, application management, infrastructure services, and more) available anywhere in a cloud using container technology.

Consider the Risks of Not Moving

Failure to migrate from POWER7-based servers to POWER9-based servers can be costly. Note that:
- IBM only allows upgrades on machines within 2 generations. Otherwise, there is no value in base machine towards upgrade.
- IBM maintains marketing support for 12-18 months on N-1 after new announcement.
- IBM software technology dividend (saving) is approximately 4.5% per generation.
- To the extent the customer maintains their OS and Middleware Stack, they can avoid costly migration services. Once this lapses, comeback is costly.
- Note that the hardware costs upgrading from either server, N-1 or N-2, are very similar. That's because Power Systems owners receive credit from past investments in their base systems.
- Maintenance costs, particularly costs associated with outdated applications about which key information has been lost and whose software and hardware is no longer adequately supported, creates risk that can be mitigated with newer technology.
- Opportunity costs, those costs incurred as maintenance spending, crowds out new application development, and packaged application spending.
- Inefficiency costs or costs incurred as the failure to proactively upgrade causes crisis mode, costly application fixes, periodic directives to move to a new platform, and wasted time and effort on flawed or failed major software improvement projects.

Summary Observations

There are a whole range of excuses for not upgrading to newer servers when older servers reach the end of their service/support life. The most common are the "ain't broke so don't fix it," the "other priorities," and the cost argument.

The "ain't broke" argument is faulty. By not upgrading, enterprises create a risk of systems or software failure; they lose the equity they have built-up in systems and software; they risk misalignment with current corporate initiatives (such as cloud and security); they risk security exposure to advanced security threats and/or cyber-attacks; and they lose-out on efficiency and capacity improvements.

The "other priorities" argument isolates older Power Systems – making them not part of the corporate whole. The reason a Power System was likely chosen in the first place was likely the fact that it processes a particular workload better than another systems architecture. For instance, Power Systems are better positioned to take advantage of new emerging applications like SAP HANA and AI. Given Power Systems advantages in processing power, in capacity, in in-memory database performance; in security – and more – failure to upgrade risks isolating older Power Systems and locking workload performance to lower performing, lower capacity hardware. This may result in an undesirable misalignment of Power Systems with the overall business strategy of a given enterprise.

The "cost" argument is the easiest to dismiss. IBM has run a number of scenario calculations, and has determined that there is potential for larger customers to save 50% or more in the first three years by moving to our POWER9 scale-up servers, while taking advantage of the other benefits of POWER9 including enhanced security and RAS, increased performance, built-in virtualization, and innovation for private cloud deployment. This estimated cost reduction does not factor in the additional cooling and power savings that may be realized based on consolidating to a single node system, so savings may be even higher in many cases.

Enterprises that have not yet upgraded their POWER7 servers to POWER9-based servers may be missing an opportunity to lower their computing costs while strategically aligning their new servers with important corporate initiatives.

Also be aware that there are several additional cost implications for not upgrading, including the loss of value in the older system towards an upgrade (Power Systems owners receive credit from past investments in their base systems); costly migration services if the older software environment is allowed to lapse; opportunity costs, those costs incurred as maintenance spending, crowds out new application development and packaged application spending; and inefficiency costs, or costs incurred as the failure to proactively upgrade causes crisis mode, costly application fixes, periodic directives to move to a new platform, and wasted time and effort on flawed or failed major software improvement projects.

With incentives to reduce computing costs with more powerful servers; with incentives to use systems equity to create a cost advantage during an upgrade; with the opportunity to significantly improve performance for accelerated workloads including SAP HANA and AI; with significant cost savings through Linux server consolidation – and with extremely strong security QoS – enterprises that have not yet upgraded their POWER7 servers to POWER9-based servers may be missing an opportunity to lower their computing costs while strategically aligning their new servers with important corporate initiatives.