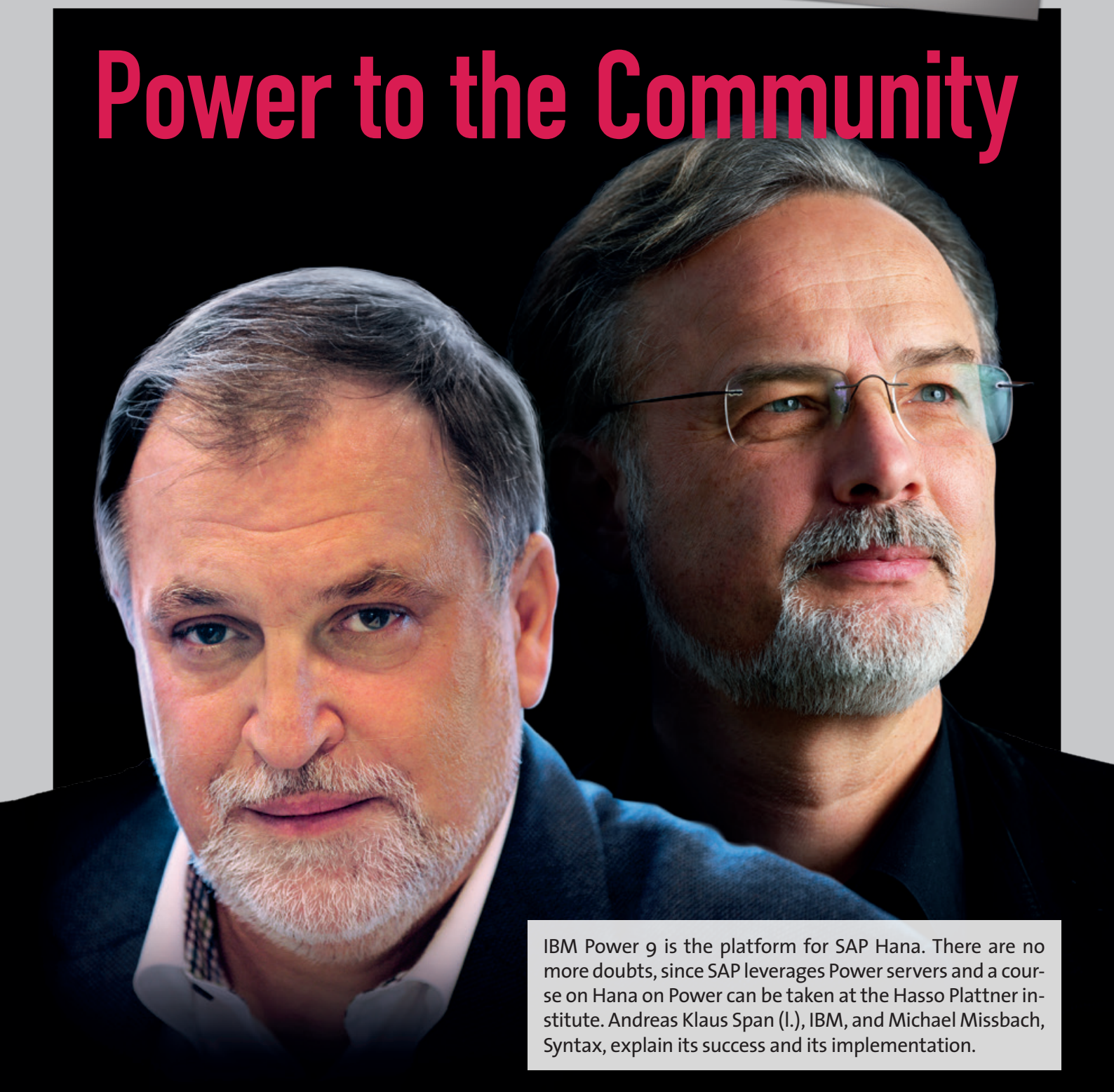


INDEPENDENT SAP TRENDS, ANALYSES, STRATEGIES AND IN-DEPTH REPORTS FROM BUSINESS AND IT



# Power to the Community



IBM Power 9 is the platform for SAP Hana. There are no more doubts, since SAP leverages Power servers and a course on Hana on Power can be taken at the Hasso Plattner institute. Andreas Klaus Span (l.), IBM, and Michael Missbach, Syntax, explain its success and its implementation.

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# Power to the Community



Dr. Michael Missbach

Klaus Andreas Span, IBM

Vorspann

At the beginning of this year, IDC market analysts asked the following question in one of their whitepapers: Who profits from SAP Hana and S/4 based on IBM Power systems?

Because of many customer and partner experiences, we know now that the answer is everyone!

*Peter M. Färbing, E-3 Magazine*

**P**rofessor Hasso Plattner chose his first partner for in-memory computing database Hana poorly. Together with Intel, he and his team at the Hasso Plattner Institute (HPI) in Potsdam, Germany, came up with a concept for in-memory-based databases. Eight years later, it became clear that the concept was right - but the hardware and the concept of appliances were a poor fit.

After the very first installations of Hana on Intel, experts were already convinced that performance, scaling, and virtualization would never reach their full potential in this combination. However, Intel would not or could not improve its hardware. Maybe Intel also believed that their connection to SAP made them unimpeachable. And for a while, it really did seem like it. Hasso Plattner and former SAP CTO Vishal Sikka long fought against transferring the Hana database to the IBM Power architecture. Even though the community already knew that HoP, Hana on Power, was the far better solution, SAP long denied IBM its Hana certification.

Even a quite exotic HP subsidiary like SGI became certified for Hana almost overnight, while IBM and its Power architecture had to watch from the outside. Meanwhile, Hana problems got bigger and bigger on Intel's platform with every passing day. Appliance sizes were not what SAP customers imagined, and the virtualization with

VMware was long not suitable for daily operations.

It was common knowledge in the SAP community that Hana operating system Suse Linux was also available on the IBM Power architecture. Switching would therefore have been no problem. Finally, SAP caved, and IBM was able to officially prove that its Power server architecture was significantly better suited for Hana than Intel processors. Of course, IBM also got rid of the one-size-fits-all appliance model and gave customers the Hana servers they had imagined all along.

SAP's and HPI's attitude towards IBM Power changed as well. The Hasso Plattner Institute started offering an online course on the future of computing on May 1st, 2019. "Future of Computing - IBM Power 9 and beyond" spanned over four weeks and was available free of charge on the IT learning platform openHPI.

## IBM Power at HPI

This online course was organized by HPI Professor Andreas Polze, Operating Systems and Middleware, Hildegard Gerhardy from the IBM Academic Initiative Europe, and Wolfgang Maier, director of IBM hardware development in Boeblingen, Germany. "We show participants different approaches to tackle the challenges of digitalization, especially the exponential growth of data," Polze explained. He highlighted the fact that the information storage capacity per capita has nearly doubled every 40 months since the 1980s.



Andreas Klaus Span, IBM, and Michael Missbach, Syntax, recount their own personal experiences with Hana on Power in the following articles.

"Not to mention that many experts actually expect the global data volume to reach 160 zettabytes in the next five years," added Gerhardy.

"More and more sets of unstructured data are generated, e.g. through the Internet of Things, and have to be analyzed. It is therefore necessary to consider different approaches in software development," said Wolfgang Maier. This includes the availability of microservices, container solutions, and cloud-based applications. Furthermore, IT departments need new basis technologies, like hardware accelerators, artificial intelligence, and blockchain, to cope with huge data volumes. Polze and his colleagues contrasted this trend of new data analytics in so-called "systems of engagement" with technologies of traditional "systems of record".

"Reliability, high availability and serviceability of systems require highly developed and sophisticated hardware, operating systems and application-independent programs to make successful transactions on huge scales possible," explains Polze. The HPI online course focuses on the future of computing with IBM Power systems. IBM cooperates with more than 200 member companies in its Open Power Ini-



tiative, including Google, Samsung and Nvidia, to create diverse innovations in software and hardware.

## Big data and DB architecture

In his Sapphire 2019 keynote, Hasso Plattner also highlighted the enormous data growth and the necessity to leverage the right server architecture and databases to quickly find solutions. In his mind, the migration to Hana should have taken SAP customers about three years. However, the database release change took longer than expected; which can partly be traced back to SAP's early commitment to the Intel platform unsuitable for Hana.

Hana development at the Hasso Plattner Institute at the university of Potsdam, Germany, focused on Intel and the x86 architecture of its Xeon processors. However, the IBM Power architecture turned out to be the better foundation for Hana. SAP gave up resisting in 2014 and allowed HoP - Hana on Power.

In-memory computing database Hana has many exceptional advantages compared to traditional SQL databases; not because SAP is better than other companies, but because Hasso Plattner dared to start from scratch. Without relics and legacies, the teams at HPI and SAP's headquarters in Walldorf, Germany, were able to begin anew. In Potsdam, students of Plattner researched and programmed together with Alexander Zeier. Mathematician and former SAP CTO Vishal Sikka

gave Hana the last finishing touch. Plattner, Zeier and Sikka not only knew Intel's processor architecture like the back of their hand. All three of them also believed that only this powerful processor would be suitable for their Hana database. In 2014, they officially realized that this was a misconception.

## IBM Power for big data

"Power 8 and also Power 9 were specifically developed to process big data volumes. Power has four times more memory and five times more cache than Intel x86. It also has higher performance than x86 - twice as much per core in benchmark, and four times as much with real customer workloads. Furthermore, it has higher flexibility with PowerVM and high reliability through redundancy, especially with Power Enterprise servers," explains Andreas Klaus Span, Director and Business Unit Executive for SAP Hana on Power. In general, Andreas Span believes that because Power comes from the enterprise realm and therefore has a different architecture, it is better suited for Hana than Intel x86 - which comes from the commercial sector and never had to be more than just good enough.

## Power as differentiating factor

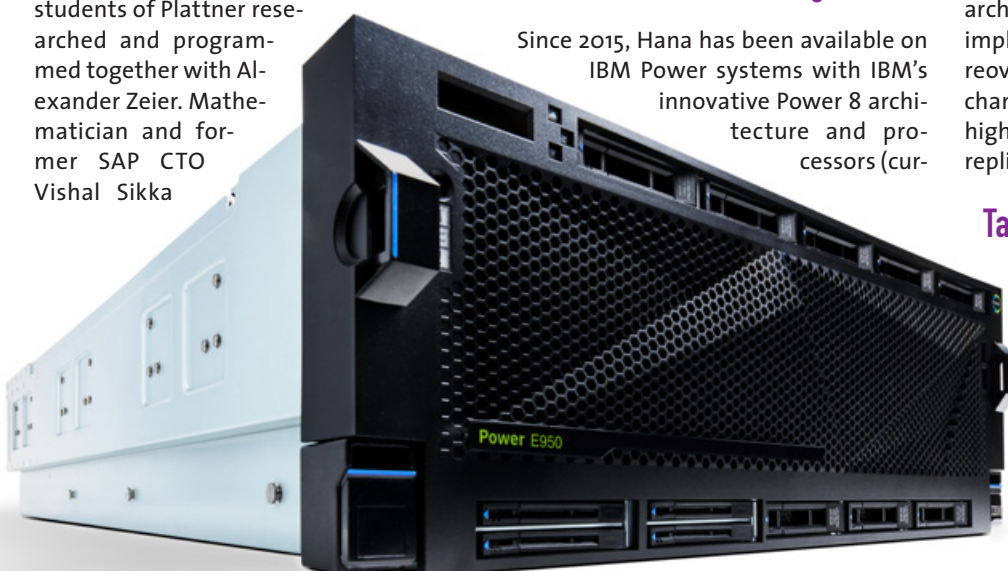
Since 2015, Hana has been available on IBM Power systems with IBM's innovative Power 8 architecture and processors (cur-

rently Power 9). IDC's market analysts are convinced that Power systems are a powerful differentiating factor for Hana and S/4. Power was specifically developed for data-intensive workloads like Hana and includes integrated, SAP-certified virtualization as well as numerous features to improve reliability. Andreas Span knows that because of weak virtualization, the increasing number of restrictions and security mistakes, and low capacity of x86 memory DIMMs, TCO approaches are not as economical as some might think. He said, "Furthermore, the Hana database and the data volume are growing exponentially. Considering these factors, Power is not only the more high-quality, stable platform, but also the more cost-efficient."

The flexibility of IBM Power systems allows for the simultaneous operation of various environments. This means that customers can for example use unused capacity from their productive environments for development and user acceptance tests. Compared to other architectures, IBM Power achieves higher efficiency from more distributed resources. IBM Power furthermore gives customers the reliability they need for critical Hana workloads. Because of reliability, availability and maintenance features, the Power architecture is uniquely suited for Hana implementations. This combination moreover supports a variety of different mechanisms, tools and processes, including high-quality support for redundancy and replication.

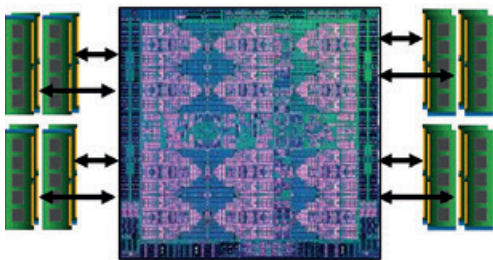
## Tailored Datacenter Integration

As always, everything depends on size. Andreas Span explains, "There may be companies who have smaller databases and not as many applications and could benefit from Intel. However, this is mostly only possible following a TDI approach (Tailored Datacenter Integration) - which even SAP recommends now."



## Two Memory Architectures for Power 9

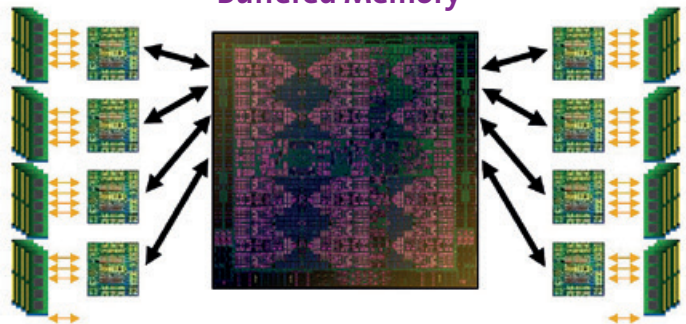
### Scale Out Direct Attach Memory



#### 8 Direct DDR4 Ports

- Up to 170 GB/s of bandwidth
- Low latency access
- Commodity packaging form factor
- Adaptive 64B / 128B reads
- Simplified Design Point

### Scale Up Buffered Memory



#### 8 Buffered Channels

- Up to 230 GB/s of bandwidth per socket
- Extreme capacity – up to 8TB / socket
- Superior RAS with chip kill and lane sparing (HE)
- Compatible with POWER8 system memory
- Agnostic interface for alternate memory innovations

With Power 9, IBM offers Hana users two architectures. Consequently, customers can benefit from maximum flexibility with a TDI approach (Tailored Datacenter Integration). Because of more options, more and more outsourcers and cloud providers are also switching from Intel to Power.

The entire Power platform is certified for Hana. “Once and for all,” said Andreas Span. “This means that we don’t have to certify every server individually, or have to have every little modification approved, like it would have been the case with appliances. Before we release new versions, like Power 9, we start testing together with SAP as early as the development phase. If everything works, we are good to go.”

SAP wants every customer on the Hana database by 2025 - and if it’s not the database, then it will certainly be the Hana platform. “For this to happen, they need a partner who can offer them a similar vision for the future,” said IBM manager Span. “We can act as such a partner. Apart from that, the code for Hana on Power and Intel has always been nearly identical - over 97 percent were the same, in fact. By now, there’s only one development department for both platforms, the code is identical, and the release times are the same.” IDC’s market analysts are therefore right in saying, “Switching to a SAP Hana in-memory platform has gotten easier in the past couple of years. Many companies already made the first step towards Hana with a migration to SAP Business Warehouse. BW is a good starting point for SAP Hana in-memory databases.” IDC also has a similar point of view on the market situation, “IBM is positioning itself as Hana and S/4 expert who can offer customers a complete package - from deciding on a strategy and functional specifications to IBM Global Business Services and implementing

and providing Power-based hardware on-prem and as hybrid cloud. As early as April 2016, IBM and SAP announced a digital transformation partnership focusing on innovative solutions to create cognitive expansions, user experience, and industry-specific functions with Hana and S/4. There are many reasons why IBM Power systems are an excellent platform for Hana, but the main ones are exceptional flexibility, resiliency, and performance.” It should also be mentioned that economic

benefits do not stop with TOC approaches. An early Hana positioning and implementing can help companies achieve competitive advantages. Furthermore, it can also help companies to position themselves better in the future. In this context, IBM is not only an infrastructure provider, but also consultant and companion on a journey which has only just begun. Because Hana is not a mere database - it is a constantly improving ERP/CRM platform for S/4, BW/4, and C/4.



Hasso Plattner during this year’s Sapphire keynote: Hana’s architecture and platform have to be modified due to enormous data growth.



Power 9 - another milestone in Power's success story

# Hana on Power

Every company wants three things from their IT landscape: guaranteed continuity, increasing performance, and investment protection. Meeting all these requirements, P9 is certainly the most stable and efficient platform on the market.

*By Andreas Klaus Span, IBM*

**W**ith Power 9 becoming available in 2018, IBM didn't just improve over its own Power products, but also increasingly over x86. Power 9 has twice as much core performance and 1.4 times more memory than x86. Compared to Power 8, Power 9 has 1.5 times as much performance and twice as much memory.

Functionality-wise, Power 9 leverages improved thread performance, optimized analytical processes, and extreme big data. There have also been innovations in the area of next-gen memory. The on-chip architecture convinces with Open CAPI and BW improvements. Power 9 offers two memory architectures: Scale-out (Direct Attach Memory) with up to 170 GB/s, and Scale-up (Buffered Memory) with up to 230 GB/s per socket and with extreme capacity (up to 8 TB/socket).

If we also factor in that Native PCIe Gen4 has twice as much memory as Native PCIe Gen3 (Power 8), then we can proudly say that we truly have the most efficient system on the market today. Also in the area of multithreading (SMT8), Power 9 offers 50 percent better scalability than Power 8 (a comparison to x86 systems



**Andreas Klaus**

Span is Director and Business Unit Executive, SAP Hana on Power and Cognitive Sales, IBM Power Systems EMEA, IBM Sales & Distribution, STG Sales, IBM Global Markets.

cannot be drawn, as they are still bound to SMT2). In their brimming IT landscapes, customers have to deal with ever-chan-

ging workloads. In this context, it is important to note that Power 9 dynamically switches between SMT models to optimize capacity and always keep applications like Hana on the safe side.

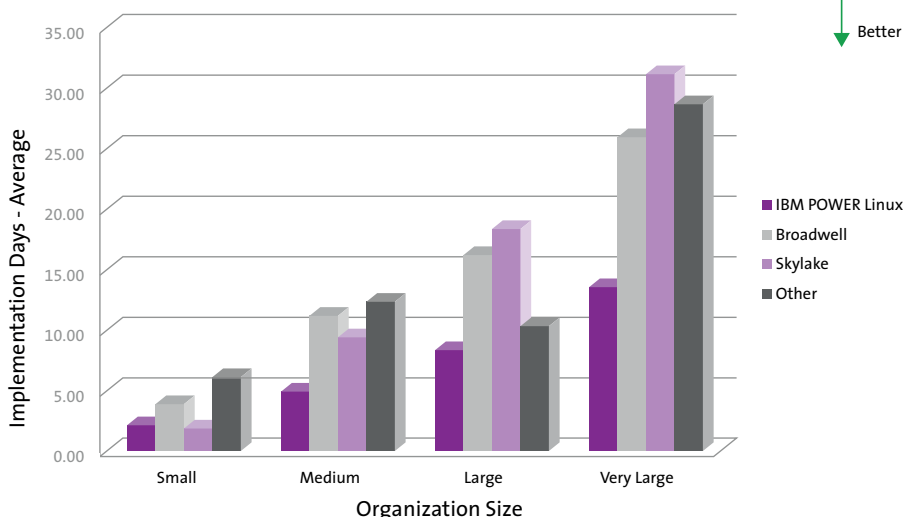
From an economical perspective and compared to e.g. Power 7, Power 9 achieves up to 50 percent cost savings in two to three years. Three times more performance/core, more than 12 percent additional capacity, and 60 percent core reduction reduce licensing and maintenance fees significantly.

## Another building block of our partnership

If we focus on our successful partnership with SAP, we can proudly say that our collaboration and technology integration have reached another milestone. Power rose through the ranks and became the platform of choice for mission critical enterprise environments. And it only took three years! More than 2250 customers worldwide can vouch for us. According to our own research and available analyst data, IBM has a market share of 20 percent in the Hana business. In May 2019 at Sapphire in Orlando, Intel furthermore announced that it had a market share of 75 percent - which would increase ours to about 25 percent. We are looking forward to independent market research confirming this information.

Based on experiences of past years in the cognitive, AI, and SAP area, Power 9 has been further optimized to be able to effectively support SAP Business Suite. The entire Power platform is still certified for Hana (from scale-out boxes with up to 24 cores and 4 TB RAM and Midrange E950 with up to 48 cores and 16 TB RAM to Enterprise E980 with up to 192 cores and 64 TB RAM). It goes without saying that we continue to support traditional workloads like AIX - there is a definitive roadmap until 2028. This is also part of our usual investment protection package and allows customers to plan long-term

Deployment Time Summary



IBM Power and Linux are the fastest. (Source: Solitaire Interglobal, [www.sil-usa.com](http://www.sil-usa.com))

## Executive Satisfaction Summary



Solitaire's market analysts found that not only executives (graph), but also departments are very satisfied with performance, reliability, etc.

and arrange transitions as they choose. The migration to Hana is taking longer than expected. In his Sapphire 2019 key-note, Hasso Plattner told attendees that he thought it would only take three years. Now, five years have gone by, and there's no end in sight. We will therefore continue to support traditional SAP solutions until 2025 and beyond, if necessary.

Regarding Linux, it is worth noting that the trend is still going towards Little Endian, and with RHEL 8 availability, it encompasses both Red Hat and Suse. (In contrast to Big Endian, Little Endian is a storage format in which the Least Significant Byte (LSB) is put first and stored in the lowest memory address.) As usual, Power 9 has the same SAP product release dates and lifecycles as x86. This is also true for source and release plans.

The trend towards Little Endian for Linux on Power also accelerates the acceptance of third-party operators. The steep increase of Hana on Linux on Power

further supports the expansion of the entire SAP ecosystem. This includes ISV solutions. The growing interest of ISVs in turn extends the reach of Hana on Power (HoP).

Another important factor is the unmatched IBM virtualization. It connects numerous SAP solutions and is still built in and free of charge.

Last but not least, here's a benchmark that we were able to achieve with a fully loaded Power 9 E980. We reached a throughput rate of 1,149,020 SAPs, which supported 205,000 simultaneous S&D benchmark users. This is roughly twice the throughput rate of the newest Intel platinum-based Skylake systems.

In general, Power 9 systems show 25 percent more SAP transaction input per core compared to Power 8 systems. The Power platform's Power Enterprise Pools combined with elastic capacity on demand were enhanced. For customers, this means a more dynamic utilization of sys-



tems as well as significantly more economic efficiency. Furthermore, the enhancement lead to live partition mobility which allows customers to migrate operating workloads between systems and guarantees uninterrupted availability.

I think we don't have to start praising RAS features again. They are still unmatched, from their flexibility to their mainframe-comparable safety coefficient.

## SAP Hana on Power – trends and facts

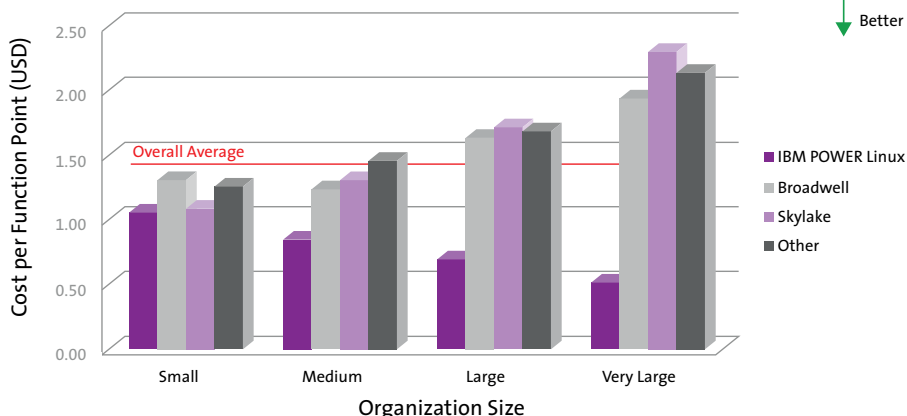
Another quick story about the unrivaled success story of Hana on Power. Last year, IBM received the SAP Pinnacle Award “SAP Global Partner of the Year - Infrastructure”. But that was not enough for us. In the first quarter of 2019, we received three SAP Innovation Awards: “Breakthrough in protein analysis advances war on cancer” together with the University of Munich; “Sustainable shopping and vision of Zero Waste: Coop improving their customer experience with AI” together with Coop Switzerland; and again with the Indus Motors Toyota Company.

More than 60 CSPs and MSPs are currently using IBM Power with their SAP workloads. The SAP cloud market has decidedly shifted towards IBM Power. Just to name a few reference customers: Syntax, Itelligence, CTAC, Seidor, D.F.I and Dedagroup.

## Cloud computing or on-prem

Of course, IBM does have Power systems in the cloud and will start offering Power 9 systems for SAP workloads (including SAP Hana) in the IBM Cloud later this year. The primary motivation for this decision were massive failures on x86 and lack of competitiveness compared to AWS and others. TCO as well as RAS availability are superior on Power. And yet, despite the success story cloud computing, I still hear some customers say that SAP neglects one of the most important implementation methods - SAP on-prem. And there is some truth to that, or at least, that is what it seems like. On-premises systems are more or less shunned. Everything revolves around the cloud. Anyone not willing or not able to follow suit is left behind - or, more accurately, left to their own devices. This was also one of the key messages of Sapphire 2019 - coming directly from Hasso Plattner himself. However, the approach that he proposes - to leave legacies behind and start over in the SAP Public Cloud - leaves out some crucial aspects.

Overall Expanse (TCO) Summary



Fast, secure, and cost-efficient: Is there anything else you could want for your SAP Hana platform? IBM has one of the lowest TCOs. (Source: Solitaire Interglobal, [www.sil-usa.com](http://www.sil-usa.com))

First, the in-memory Hana concept was originally meant for the commodity market and was restricted to x86. This is becoming more of a problem every day. Appliances are not up to date anymore (even SAP is now recommending TDI, Tailored Datacenter Integration, wherever possible) and Hana is full to the brim.

New strategies like data tiering are marketed as innovation. However, they are only weak attempts at trying to curb the exponential growth. The cloud is becoming a mystic and legendary medium who can save everybody and anybody. It's not that the cloud is inherently better - it is only as good and as economical as its underlying infrastructure. Companies like Syntax don't build their cloud strategy on Power because we are such good friends and they want to help us out, but because it gives them a competitive technological and economical advantage over AWS and others.

Second, choosing a cloud environment can come with some long-term, non-terminable strings attached - even though that was never the intention. Not to mention the question of how you would ever get sensitive data out of the cloud again. Every experienced analyst is therefore advocating for a hybrid cloud strategy - and so are we. A good balance between on-prem systems and cloud guarantees a stable, secure, manageable, and cost-efficient IT strategy. What the implementation of such a strategy would look like in real life and what challenges customers would face explains one of our most successful partners, Syntax, in the following article.

But we do not stop at technological and economical benefits. We are also involved in the academic sector. For example, we have been collaborating with the Hasso Plattner Institute in Potsdam, Ger-

many since 2016. Since May 1st 2019, they have been offering an online course titled “Future in Computing - IBM Power 9 and beyond” on [openHPI.de](http://openHPI.de). Recently, the HPI course reached 1,500 participants. This cooperation is very important to IBM because it helps us adjust our offers to the ever-changing requirements of IT, customers, and companies.

We want to talk to future generations and benefit from their unbiased ideas. Developers and technicians who have been in the IT sector for long enough can become set in their ways. Not as much as other professions, of course - change is their bread and butter, after all. But new and fresh ideas can serve as the starting point for disruption, and usually, they come from younger generations, unburdened by past mistakes and legacies keeping them from embracing the future. SAP itself is following that same strategy by hiring ever more young top talent. New and younger top executives have taken on leadership roles in recent months, many of them HPI alumni themselves. And all of them are chanting the same mantra, “Innovation! Innovation! Innovation!”

In conclusion, we can look back on a surprisingly fast success story of our SAP and IBM cooperation in the Hana environment. We are therefore confident that we can increase our market share in the future. Considering the number of companies still having to implement the Hana platform, a 50 percent market share doesn't seem like too high a goal.

Also have a look at the community info on page 72

IBM





Why we decided on IBM Power as platform for flexHana

# Practical Experience with Hana on Power

Like so many others, we implemented our first Hana systems as appliances because there was no alternative. This was a challenge, to say the least. For example, we could only order the appliance once the customer had signed the contract - and technically, the customer then owned it.

*By Michael Missbach, Syntax (formerly Freudenberg IT)*

Our customers were accustomed to having traditional SAP systems delivered by our private cloud in just a few weeks. Because of SAP's appliance concept, however, the customers had to wait way over a month for their Hana systems. The appliances of a given size had to first be manufactured, delivered, and declared at customs before they could be integrated into our cloud datacenter, after all. But once the appliance was finally in our datacenter, the ordeal was far from over. We had to integrate a bare metal system as customer-specific appliance into an environment which was optimized for standardization, virtualization, and automated deployment. Not to mention monitoring, patching, and customizing.

## Hana T-shirt sizes

Due to the rigid limitation to T-shirt sizes, we were also unable to customize the system according to customer-specific needs. Unfortunately, flexibility is a foreign concept for appliances! We always had to round up memory and guess what the customer might need in three years. This naturally led to significantly higher costs.

In many cases, the customers' demand for memory had increased faster than expected. The only way to "upgrade" an appliance, however, is to physically install more DIMMs and CPUs - if the motherboard could even support them. If that wasn't the case, we were forced to order a bigger appliance, leaving a system behind with no use for the customer.

## Never touch a running appliance

But even if an upgrade was possible, as practical experience proves, the old saying in IT "Never touch a running system" still holds true. Additional DIMMs and CPUs have to be pushed into place with some force, which causes the motherboard to bend. Consequently, other connections might loosen a little or disconnect completely. In some cases, cool-



Dr. Michael Missbach,  
Syntax.

ing fans didn't blow, or the entire system didn't boot at all. The manufacturer's service technicians had to be called - while the customer was still waiting to resume his business!

All in all, Hana as appliance was an unsatisfactory solution for everyone involved. The whole concept simply contradicted the very idea of cloud computing. Maybe this caused the low implementation rates in the first years of Hana.

## Tailored Datacenter Integration

Fortunately, hardware providers and major customers were able to convince SAP to leave the rigid appliance model behind - step by step. In the first phase, customers were allowed to use external storage arrays instead of internal ones. After some time, customers with small systems were even allowed to use the more cost-efficient E5 processors. Last but not least, SAP allowed support for VMware and IBM Power - all under the label of Tailored Datacenter Integration (TDI).

## Tailored suit instead of straitjacket

This granted us the possibility to provide customers with a tailored suit perfectly integrated into private cloud environments instead of a straitjacket off the rack. However, there was still the question of which platform to use.

We compared the restrictions of VMware on Intel with IBM Power with built-in virtualization and found differences in the possible size and number of virtualized Hana systems. Furthermore, many customers told us that they would need significantly more memory than the 3 TB a traditional 4-socket Intel system could provide at the time. These customers also needed all the memory in a single instance because their experiences with scale-out hadn't exactly been pleasant.

Based on these facts and because of our customers' experiences with IBM Power, we decided on two machine types: S824L for Hana systems for up to 2 TB, and E880 for anything larger. We also added the E850 with 4 TB as soon as it was available, which became the ideal workhorse for our company. The Linux-only versions of Power needed for Hana are furthermore significantly more cost-efficient than AIX. After only a short time, our decisions proved to be right, as we and our customers experienced technical and economic success.

## Virtualization

IBM's virtualization is a product of the mainframe era (who still remembers MVS?). Because of that, the additional latency losses typical for third-party virtualizations can be avoided. For Hana, this results in bare metal performance. Memory and CPU performance can be tailored to customer needs in increments of 1 MB and 1/20 cores.

Our practical experience demonstrated that Hana generally only needs a mere fraction of what SAP recommends in regards of CPU performance. This is a safe-



guard for the rare cases in which Hana indeed does need more performance. With Power, we can redirect the unused CPU performance into a pool to be used by other Hana systems operating on the same machine. If a system needs more performance than expected, it can use the pool for the excess performance - without any admin intervention and without the customer having to pay more. In theory, we could also dynamically adapt memory - if Hana didn't still try to access non-existent resources after memory reduction. We therefore recommend restarting Hana after changing memory resources.

Especially LPAR Live Mobility - which is able to transfer even large live Hana instances from one machine to another - has proven to be very useful. Even though Power hardware is extremely stable, lar-

ger machine parks will still have problems once in a while, making it necessary to replace components. We also had a few problems with IBM Power before, but fortunately for us, the internal monitoring made us aware of most of these problems before they could cause trouble, or they were absorbed by redundancy.

Thanks to Live Mobility, whenever there was a problem, we were able to remove customer systems from the affected machine, replace the motherboard or the network card, and put the systems back in place without our customers even noticing or their operations being disrupted. Even a complete change of architecture - from Shared Cluster to SAN boot, where we were able to clear and reconfigure every machine in turn - was possible without affecting customer operations negatively.

## Memory Tetris

Sales team and customers were especially excited about an additional benefit. With some proactive planning, it is possible to always have enough resources to have even mid-sized Hana systems ready short notice. If no memory big enough is available on a single machine, we were able to clear some space by relocating and swapping smaller systems. This process is very reminiscent of the classic computer game Tetris, where building blocks falling from the sky at random have to be fitted together.

In our case, the blocks falling from the sky are our customers' demands for new Hana systems in every possible size, preferably already available yesterday. Just like in the computer game, we are able to

Category	Commentary	Quick Byte
Time to Market	The optimizations built into the Power platforms augment provisioning, testing, and other factors to produce agility that averages as little as 36.3 % of the setup time required by other platforms.	Get your systems up-and-running faster.
Flexibility	The reported, average resilience of these Power implementations is as much as 6.5 times of the other options, provided by a platform that can reconfigure to handle changing load demands.	More easily handle unexpected activity spikes.
Total Cost of Ownership	The expenditures for Power implementations are lower by as much as 78 % compared to those of other platforms.	Greatly reduce TCO compared to competitors.
Staff	Based on the detailed customer reports, deployment on Power Linux requires less staffing to do the same amount of work. The overall staffing was a little as 67.32 % of the operational staff time reported for other alternatives.	Do more with fewer staff resources.
Risk	A substantial reduction has been reported as much as 57.81% lower than the rest of the studied platforms by customers all over North America.	Significantly reduce risks of security incursions, inadequate performance, and system failure mean happier customers and more revenue.
Reliability	The IBM Power Linux platform has unavailability that can be as low as 1/6 th as other options.	IBM Power Linux provides a more reliable and consistent platform choice.
Customer Satisfaction	The reported executive satisfaction is higher by as much as 38.16 % other architectures.	When the top executive knows that the solution is good, everyone is satisfied.
Security and Resiliency	IBM's commitment to addressing the Spectre, Meltdown, and other chip vulnerabilities is unmatched by any of the competitive organizations.	Deploy a base security platform that's more effective than the competition.

There are many benefits to using Hana and IBM Power. Here's an overview by Solitaire Interglobal, [www.sil-usa.com](http://www.sil-usa.com)



POWER Model <sup>1)</sup>	Minimal cores per LPAR (128GB)	Maximal cores per LPAR	Max. memory per LPAR <b>BW or BW/4HANA</b>	Max. Memory per LPAR <b>SoH or S/4HANA</b>	Allowed PowerVM LPARs (SAP-Note <b>2230704</b> )
S822	4	20	<b><u>2188482 – SAP HANA on IBM Power Systems: Allowed Hardware</u></b> <ul style="list-style-type: none"> <li>Use workload based sizing introduced by SAP TDI5</li> <li><b>Maximum supported memory is defined by SAPS capacity of the server and the individual HANA workload SAPS requirements</b></li> <li>Current memory limits for POWER8 systems are:</li> </ul>	16 TB 24TB	<ul style="list-style-type: none"> <li>4 dedicated(-donating) PROD</li> <li>3 dedicated(-donating) PROD +</li> <li>1 shared pool for other workload</li> <li>optional 2 VIOs</li> </ul>
S822L	4	24			
S824	4	24			
S824L	4	24			
E850C	4	48			<ul style="list-style-type: none"> <li>6 ded. or 5+1</li> </ul>
E870	4	80			<ul style="list-style-type: none"> <li>8 ded.(-don.) PROD</li> <li>7 ded.(-don.) PROD +</li> <li>1 shared pool for other workload</li> <li>optional 2 VIOs</li> </ul>
E880C	4	192 (BW type) 176 (SoH, S/4)			
S922 / H922	4	20	<ul style="list-style-type: none"> <li>Current memory limits for POWER9<sup>2)</sup> systems are:</li> </ul>	16 TB 24TB	<ul style="list-style-type: none"> <li>4 dedicated(-donating) PROD</li> <li>3 dedicated(-donating) PROD +</li> <li>1 shared pool for other workload</li> <li>optional 2 VIOs</li> </ul>
L922	4	24			
S924 / H924	4	24			
E950	4	48			<ul style="list-style-type: none"> <li>16 dedicated(-donating) PROD</li> <li>15 dedicated(-donating) PROD +</li> <li>1 shared pool for other workload</li> <li>optional 2 VIOs</li> </ul>
E980	4	192			
Scale-Out (Multi-Host)		max. cores per node *max. 16	max. memory per node *max. 16	<b>S/4HANA only:</b> min. 6TB per node *min. 2 max. memory per node *max. 4	as with single node

IBM's broad offering for Hana on Power (HoP) - the opposite of T-shirt sizes, but business-oriented.

skillfully relocate resources to make sure that almost 100 percent of the memory of every machine is used, filling in unused slots and transferring smaller systems whenever necessary.

This also makes our Chief Financial Officer (CFO) happy, even though he always professionally complains that we have to buy new systems every few weeks because of increasing customer demands. However, this strategy can not only be used with new customer requests. We can also adapt customer systems to their real-life usage. Our Hana Memory Observation can forecast when our customers might need more memory for their Hana system to prevent termination of large reports because of “Out of Memory” (OOM). This further highlights our commitment to make using Hana as convenient as possible for our customers. It also shows that the Hana appliance model would have never been enough for customer operations in the long term.

This may be one of the biggest benefits that we can offer our customers with Hana on Power. Many customers furthermore appreciate the possibility of using even larger Hana systems temporarily for a PoC. Once the PoC is finished, all the resources are redistributed without additional costs for customers. This means that

customers only have to pay for what they really need - even with large Hana systems. Again, this would have been impossible with Hana on Intel and its rigid T-shirt sizes.

However, many cloud providers are doing the exact opposite. Customers have to book and pay for large Hana instances which do not fit on standard blades often three years in advance. This means they have to guess and round up memory - not very sustainable in the long term.

IBM Power truly is significantly better suited for Hana than Intel, not only because of its increased memory or faster performance, but also because of its built-in, efficient virtualization. The only drawback here is that a Power machine with 4 TB cannot provide 4069 GB. That's because the built-in virtualization itself needs some GB. In most cases, however, customers can easily accept that 1 TB means 1000 GB - making the supposed problem disappear.

New IBM Power 9 machines, which provide up to 16 TB with high density DIMMs and up to 8 TB with more cost-efficient DIMMs, grant yet another opportunity to optimize system landscapes even further. Consequently, Hana on Power becomes what you'd expect Hana in the cloud to be.

## Conclusion

Thanks to Hana on Power, we were able to flexibly and cost-efficiently integrate Hana into a private cloud and therefore significantly increase the satisfaction of customers, sales teams, and our finance department. Flexible system sizes, high availability of new systems and temporary usage of resources are good for customers as well as sales, and an almost complete return of investment pleases the finance department. Moreover, we are able to offer 24/7 operation of larger Hana systems for significantly less than every public cloud provider.

Our ever-increasing number of installations gives testimony to this development. At the moment, our Hana on Power system landscapes grows 1 TB per week because of new customer installations - with strong tendencies to double soon. Hana on Power is what you'd expect Hana in the cloud to be. We at Syntax (formerly Freudenberg IT) call that flexHana.