LOWER COSTS AND COMPARABLE PERFORMANCE JUSTIFY MIGRATING TO THE SAP HANA® PLATFORM SOONER

Tests at the SAP® Co-Innovation Lab demonstrate dramatic cost savings and comparable performance using SAP HANA Dynamic Tiering and all-flash Pure Storage® solutions.

PURESTORAGE®

MIGRATING TO SAP HANA VS. NOT MIGRATING AT ALL

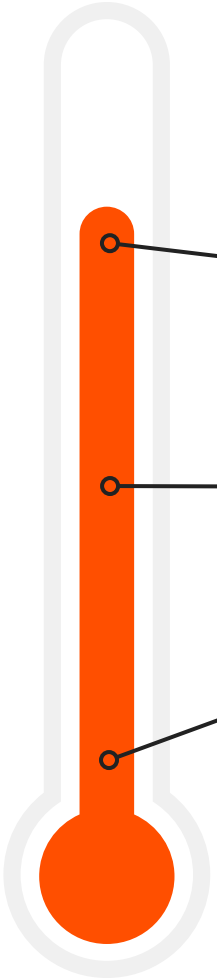
Despite the potential business value of the real-time data insights the SAP HANA platform can deliver, it remains a want-to-have solution for many organizations. Chances are that your business isn't one of the roughly 6,400 organizations reported to be using SAP HANA.[1]

The reason that SAP HANA remains a want-to-have solution for many businesses is that an initial migration project for SAP HANA can add up when the costs of the license, hardware, deployment, and staff are calculated. It's a cost that many organizations aren't prepared to incur.

Yet, while the costs of moving to SAP HANA can be high. So too can the overall cost of not migrating. Quantifying the impact of what happens if competitors migrate to SAP HANA and your organization doesn't isn't easy.

There is a way, though, that organizations can migrate to SAP HANA and start realizing all the business value of real-time insights virtually immediately, without paying the potentially limiting upfront and ongoing costs — run SAP HANA with SAP HANA Dynamic Tiering on an all-flash infrastructure.

SAP HANA Dynamic Tiering is an add-on for the SAP HANA database. It allows less frequently used data (warm data) to be moved from the main in-memory SAP HANA database into extended storage. Using extended storage can dramatically reduce costs by decreasing the size of the SAP HANA database — thereby lowering maintenance, hardware, and software/licensing costs. When the extended storage is an all-flash infrastructure, performance loss can be minimized compared to keeping all data in SAP HANA itself.



DATA TEMPERATURE

A multi-temperature data-management solution involves three types of data.

Hot Data

Data that is frequently accessed from fast storage.

Warm Data

Data this is less-frequently accessed and stored on slightly slower or external storage.

Cold Data

Data that is rarely accessed and stored on the slowest storage that an organization has.

MIGRATE TO SAP HANA FOR LESS WITH AN ALL-FLASH INFRASTRUCTURE

To demonstrate how SAP HANA Dynamic Tiering on an all-flash infrastructure can save organizations millions of dollars while helping them realize virtually full SAP HANA performance, Pure Storage tested the cost and performance impacts of running SAP HANA with SAP HANA Dynamic Tiering on the Pure Storage FlashStack™ converged-infrastructure solution at the SAP Co-Innovation Lab (COIL). Full details on this testing can be found in "Pure Storage IoT solution (@SAP COIL): IoT Design Guide Using Virtualized SAP HANA with Dynamic Tiering on Pure Storage."

Results show that when an organization runs SAP HANA with SAP HANA Dynamic Tiering on the Pure Storage FlashStack infrastructure, it can quickly and easily start using SAP HANA at a dramatically lower cost — up to 75 percent lower — while obtaining performance virtually equal to running SAP HANA without SAP HANA Dynamic Tiering.[3]

Collaboration between Pure Storage and SAP helps ensure organizations will be ready and able to reduce the overall in-memory data footprint and offload less frequently used warm data onto all-flash technology while still obtaining high performance with future SAP HANA capabilities, whether those are capabilities of SAP HANA Dynamic Tiering or something else.

The Pure Storage FlashStack Solution as the All-Flash Infrastructure for SAP HANA

The Pure Storage FlashStack solution is an all-flash converged infrastructure that combines the latest in Cisco® compute and networking, Pure Storage data storage, and virtualization software in a single, integrated architecture.

The FlashStack solution enables businesses to run online transaction processing (OLTP) and online analytical processing (OLAP) solutions in parallel on the same infrastructure and obtain unprecedented performance while lowering overall capital expenditure, complexity, and risk. The FlashStack solution delivers high read and write data performance; read performance is virtually the same for retrieving data directly from SAP HANA as it is for retrieving data from SAP HANA Dynamic Tiering.

Instead of adding SAP HANA licenses, software, and hardware, an organization can use SAP HANA Dynamic Tiering on the FlashStack solution and realize dramatic reductions in cost with minimal performance loss — performance is still more than 10 times better than when running SAP enterprise resource planning (ERP) or SAP Business Warehouse (SAP BW) on a traditional relational database management system (RDBMS) deployment, such as Oracle.[3]

UP TO 75% LOWER COST

to run SAP HANA with SAP HANA Dynamic Tiering on the Pure Storage FlashStack infrastructure[3]

FIGURE 1. Pure Storage tested the cost and performance impacts of running SAP HANA with SAP HANA Dynamic Tiering on the Pure Storage FlashStack converged-infrastructure solution at the SAP Co-Innovation Lab (COIL). Results show that organizations can quickly and easily start using SAP HANA for up to 75 percent less cost while obtaining performance virtually equal to running SAP HANA without SAP HANA Dynamic Tiering.[3]

SAP CO-INNOVATION LAB (COIL)

The global SAP COIL network is recognized as the place for companies within the SAP ecosystem to jointly work with a broad range of SAP development and business teams.

COIL offers a portfolio of co-innovation enablement services. Its cloud-based infrastructure platform enables SAP to provide project participants with co-innovative project design — in addition to IT resources — to fully provision all SAP software landscapes and key partner components.

Successful project outcomes can immediately gain recognition from the demos and showcasing that the lab offers.

PUTTING DRAMATIC COST SAVINGS AND PERFORMANCE TO THE TEST

Pure Storage's test results for running SAP HANA with SAP HANA Dynamic Tiering on the FlashStack converged infrastructure show the cost and performance advantages of using all-flash technology for SAP HANA. Results show that the robust read performance of the tested Pure Storage solution can deliver performance for queries in SAP HANA Dynamic Tiering that is comparable to the performance of data queried entirely from SAP HANA in-memory.

Baseline

The testing queried 500 million records with 1 TB of data queried entirely from SAP HANA to determine a comparative baseline of 0.69 seconds query time. SAP's own baseline query performance for running data on SAP HANA — 13.90 times faster than the same data run in a traditional Oracle environment — was used as a comparative baseline for data in a legacy environment. The results consider that licensing, software, and hardware costs for SAP HANA Dynamic Tiering are lower than those for an all in-memory SAP HANA implementation.

Cost-Savings Comparison

Using the baseline, the tests were run with varying amounts of data — 25, 50, or 75 percent of the 1 TB total — offloaded from SAP HANA to SAP HANA Dynamic Tiering run on a Pure Storage FlashStack solution. The findings show that using SAP HANA Dynamic Tiering on the Pure Storage FlashStack solution results in imperceptible performance loss compared to having all data in-memory in SAP HANA. The more data that an organization offloads to SAP HANA Dynamic Tiering, the less hardware, software, and licenses for SAP HANA the organization will need, resulting in dramatically lower costs that only decrease more as additional data is offloaded, as shown in Figure 2.

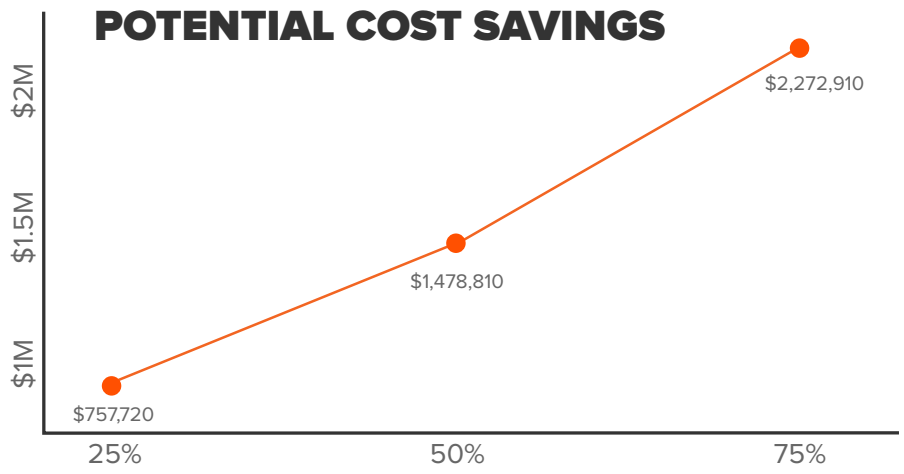


FIGURE 2. SAP HANA cost savings with 25, 50, or 75 percent of data moved to SAP HANA Dynamic Tiering, assuming a hardware, software, and licensing cost of over $2,484,000 with 100 percent of data in SAP HANA and hardware cost savings based on additional memory and CPU requirements and assumed license cost of 159,000 per 64 GB for SAP HANA Enterprise Edition and maintenance. Savings increase with more data stored in and queried from SAP HANA Dynamic Tiering.

THE PURE STORAGE FLASHSTACK SOLUTION

The FlashStack solution is an all-flash converged-infrastructure solution that brings the flash revolution to SAP solutions. It combines Pure Storage all-flash storage with best-in-class compute and networking components from Cisco in an integrated architecture that speeds time to deployment, lowers costs, and reduces deployment risks for SAP HANA implementations.

Performance Comparison

An organization can obtain these savings with a virtually imperceptible impact on performance. In fact, an organization can still obtain performance more than 10 times better than if using a legacy Oracle environment to query the same data.

With 25 percent of data in SAP HANA and 75 percent in SAP HANA Dynamic Tiering on the FlashStack solution, querying 500 million records takes just 2.40 seconds total. Compare that to the 0.69 seconds it takes when all data is in SAP HANA, and it only takes an additional 1.71 seconds to query data when 75 percent of data is stored in SAP HANA Dynamic Tiering on the FlashStack solution. However, by doing so, the organization has saved a potential $2,272,910 in software, hardware, licensing, and maintenance costs for SAP HANA.

Given that the normal resting respiration rate for an adult averages 12 to 16 breaths per minute (0.267 breaths a second), that means a user waits only half a breath longer when using the FlashStack solution to store 75 percent of data in SAP Dynamic Tiering; and less than one-quarter of a breath longer if just 25 percent of the data was moved to SAP Dynamic Tiering, rather than having it all in SAP HANA.[4] Plus, compared to running SAP software on an RDBMS, such as Oracle, the performance gain is still significant.

Costs savings and comparable performance aren't the only benefits of using a Pure Storage FlashStack solution to offload SAP HANA data into SAP HANA Dynamic Tiering. Added benefits include additional data reduction, deduplication, and accelerated data offloads in SAP HANA Dynamic Tiering.

Data in SAP HANA	100%	75%	50%	25%
Data in SAP HANA Dynamic Tiering on Pure Storage FlashStack	**0%**	**25%**	**50%**	**75%**
Approximate Query Time in Seconds from Pure Storage Testing	0.69 seconds	1.36 seconds	1.82 seconds	2.40 seconds
SAP HANA vs. Oracle Performance Difference Based on SAP's Benchmark Tests[3]	13.90x faster	11.93x faster	11.26x faster	10.42x faster
Estimated Query Time Compared to 133.30 seconds for the Same Data in Oracle[5]	9.59 seconds	11.17 seconds	11.84 seconds	12.79 seconds

FIGURE 3. Query performance comparison with 25, 50, or 75 percent of data moved from SAP HANA to SAP HANA Dynamic Tiering on the FlashStack solution for 500 million queries; Oracle results and performance increases assume SAP's own baseline query performance for running data on SAP HANA of 13.90 times faster than the same data run in on a legacy Oracle environment with a total query time of 133.30 seconds.[5]

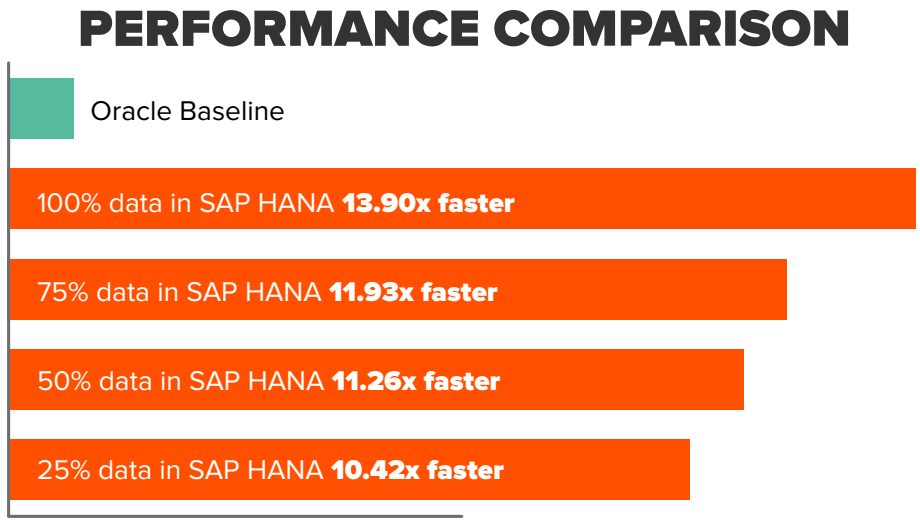


FIGURE 4. Estimated performance comparison with 0, 25, 50, or 75 percent of data moved from SAP HANA to SAP HANA Dynamic Tiering on the FlashStack solution; Oracle results and performance increases are estimated based on SAP's own baseline query performance for running data on SAP HANA an average of 13.90 times faster than the same data run on a legacy Oracle environment.[5]

ADDED PERFORMANCE BENEFITS FROM RUNNING SAP HANA DYNAMIC TIERING ON THE ALL-FLASH PURE DATA-CENTRIC ARCHITECTURE

Ultimate Data Reduction

Pure Storage provides the ultimate data reduction with both in-line lossless deduplication and compression. For SAP HANA, Pure Storage can additionally reduce data 1.9 to 2.3 times beyond what SAP HANA provides on its own. This means that more data can be stored in less space, which also contributes to cost reductions.

Adding SAP HANA Dynamic Tiering to a deployment with Pure Storage infrastructure enables SAP HANA data to be further reduced between 2.2 and 2.6 times more than what SAP HANA does alone for the same data.

Accelerated Data Offloads

Initially offloading data from SAP HANA to SAP HANA Dynamic Tiering can take significant time and potentially cause performance degradation. An organization might offload customer invoices older than 12 months. If there were initially several thousand invoices older than 12 months (warm data), more data would be offloaded the first time than subsequent offloads, where a store procedure would be used to migrate invoices only as they became older and the quantities of records offloaded would be smaller.

If performance degradation during the initial offload occurs, any costs savings would be diminished or lost. Pure Storage, however, accelerates data-offload time when moving data from SAP HANA to SAP HANA Dynamic Tiering. For the testing covered in this paper, the entire data offload took slightly more than 21 minutes.[3]

FLASHARRAY//X: SHARED ACCELERATED STORAGE

Meet the first enterprise-class, all NVM Express® (NVMe™) flash storage array that goes beyond modern all-flash arrays (AFAs) to drive a new era of performance, simplicity, and consolidation.

The Pure Storage FlashArray//X solution goes beyond previous-generation Pure Storage FlashArray solutions to deliver the same performance and availability, the same simplicity, the same Evergreen™ Storage model, and the same ability to consolidate in a 100% NVMe infrastructure. Add to that a multi-site active/active stretch cluster and up to 3 PB in a single 6U chassis, and achieving near in-memory performance for your SAP HANA Dynamic Tiering data is just the beginning.

LEARN MORE ABOUT ACCESSING THE VALUE OF SAP HANA FOR DRAMATICALLY LESS COST AND VIRTUALLY IDENTICAL PERFORMANCE

Your organization can access the value of real-time data while realizing a total potential annual savings between $757,720 and $2,272,910. And you can do that while still achieving 10.42 times faster performance for your SAP HANA implementation when using the FlashStack solution, compared to a legacy Oracle environment.

For full details on test results and configuration details for the testing done at SAP COIL, and to learn more about the Pure Storage FlashStack solution, read **"Pure Storage IoT solution (@SAP COIL): IoT Design Guide using Virtualized SAP HANA with Dynamic Tiering on Pure Storage,"** or contact your Pure Storage representative.

1 As of June 2015. Source: Business Insider. "SAP Just Shared Detailed Customer Figures for Its Most Important Product." June 2016. www.businessinsider.com/sap-shares-hana-customer-numbers-2015-6.

2 SAP. "SAP Committed to Innovation and Choice for SAP Business Suite Applications." October 2014. https://news.sap.com/sap-committed-innovation-choice-sap-business-suite/.

3 Pure Storage. "FlashStack IoT Solution (@SAP COIL): IoT Design Guide Using Virtualized SAP HANA® with Dynamic Tiering on Pure Storage." August 2016. www.purestorage.com/content/dam/purestorage/pdf/whitepapers/IoT_Design_Guide_using_Virtualized_SAP_HANA_with_Dynamic_Tiering_on_Pure_Storage.pdf.

4 Johns Hopkins Medicine. "Health Library: Vital Signs (Body Temperature, Pulse Rate, Respiration Rate, Blood Pressure." www.hopkinsmedicine.org/healthlibrary/conditions/cardiovascular_diseases/vital_signs_body_temperature_pulse_rate_respiration_rate_blood_pressure_85,P00866/.

5 SAP. "HANA Performance Test Benchmarks." May 2015. https://scn.sap.com/people/sheetal.jain/blog/2015/05/21/hana-performance-test-benchmarks#.

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