PUND-IT™
INVESTIGATE - INTERPRET - INFORM

Marketplace Update

December, 2014

- ## Production SAP HANA on VMware vSphere: Demystifying Implementations

By Charles King, Pund-IT, Inc.

Pund-IT, Inc.
Hayward, CA
U.S.A. 94541

Contact:
Office: 510-383-6767
Mobile: 510-909-0750
charles@pund-it.com
www.pund-it.com

Production SAP HANA on VMware vSphere: Demystifying Implementations

By Charles King, Pund-IT, Inc.

The software-defined data center (SDDC) is a revolutionary concept with roots deep in traditional IT infrastructure deployments and management practices, particularly virtualization. Decades ago, companies began exploring ways of escaping the batch jobs/ time share limitations of early systems. The resulting "virtual machine" solutions provided the entry into broader virtualization technologies that supported the abstraction and pooling of physical server resources.

By doing so, enterprise customers were able to attain far greater levels of system utilization than they could with traditional tools, and to more efficiently consolidate workloads and business processes. So it was not surprising that IT vendors began exploring means of virtualizing and abstracting other system resources, including data storage and networking components.

Flash forward to 1998 when VMware arrived with the intention of developing virtualization and abstraction technologies that would enable Intel-based scale-out systems to capture the same benefits common in scale-up servers. A decade later, then-VMware CEO Paul Maritz announced the VMware vCloud Suite with the goal of commonly extending VMware software and management capabilities across all data center and IT infrastructure assets.

From concept to mission critical

The VMware vCloud Suite launch probably marked the beginning of what became the move toward SDDC, but it didn't stop there. Virtualization is now so common in data centers of every sort that it's difficult to imagine enterprise IT without it. In fact, the disparity between the native performance of systems and applications is so wide that running most workloads without virtualization makes little sense technically or economically.

Good enough, but what is the next step in the SDDC journey? We believe that process consists of organizations increasingly virtualizing their mission-critical applications, like SAP's Business Suite (ERP, CRM, SRM, SCM and PLM solutions), along with production data center platforms for workloads that need high levels of RAS (reliability, availability, serviceability), support advanced services and/or require superior end-user experience.

Next-gen SDDC innovations: SAP HANA

VMware and its hardware vendor partners have reported numerous customer testimonials suggesting that this stage of SDDC evolution is well underway. But there is another area worth considering related to SDDC supporting and enhancing next-generation platforms. In our opinion, SAP's HANA in-memory database and analytics platform belongs at the top of the list of applications that organizations should consider virtualizing.

What is SAP HANA? In short, it is an innovative alternative to traditional transactional, data warehousing and business intelligence (BI) solutions. More specifically, SAP HANA converges data processing with real time application services so businesses can gain significant benefits by combining OLTP and OLAP processes.

How does it work? SAP HANA is fully ACID compliant and, rather than housing database assets in dedicated storage environments where they can be accessed by various business applications and processes, SAP HANA maximally compresses the data and stores it in columnar format directly in a system's memory.

Why is this important? Because doing so removes the storage, network and I/O "bottlenecks" that typically constrain database loading/query response time. In addition, SAP HANA supports powerful complementary features, including business process and application libraries, and predictive, geo-spatial and text analytics.

What does this mean in real-world terms? SAP HANA users commonly report orders of magnitude improvements in determining/delivering query responses. SAP HANA can also support both traditional and real time analytics processes, including streaming data.

Plus, since such a wide variety of information and processes, including structured, semi-structured and unstructured data can be used in SAP HANA, it qualifies as a remarkably flexible platform for "big data" use cases. That's one reason that Cisco, Dell, Fujitsu, HP, Hitachi, Huawei, Lenovo, NEC, Silicon Graphics and VCE all offer validated SAP HANA solutions with Intel Xeon processors (lists of certified solutions are available here).

Finally, SAP continues to improve the platform. At its recent TechEd 2014 conference, the company announced new features for SAP HANA Service Pack 9 (SPS 09): support for multi-tenant database containers (critical for cloud-based implementations), dynamic tiering (allowing the separation of "warm" and "hot" data to cost effectively balance the use of memory and disk storage assets) and integration with Hadoop data stores (so SAP HANA can access, analyze and write data into Hadoop).

Why virtualize SAP HANA?

Combining the SAP HANA platform with VMware vSphere offers organizations a number of clear benefits. First, SAP HANA is fully certified to run on VMware vSphere by both companies. Also, no additional SAP costs or licenses are required to run SAP HANA – it is treated/licensed like any application or virtual machine in a VMware vSphere environment.

In addition, virtualizing SAP HANA allows businesses to extend the training/management investments they have already made in VMware and related systems. In these budget-constrained times, that can mean a lot. Plus, the well-established benefits of VMware vSphere, including lower TCO, faster time-to-value and enhanced service levels also apply to SAP HANA implementations.

Taking a longer view, virtualizing SAP HANA can help accelerate the achievement of business and computing goals where quick access to/analysis of critical information provides valuable, actionable business results. That may not be on a company's roadmap today but we believe it will eventually be common among most commercial organizations.

Virtualizing SAP HANA: Myths exploded

Despite its well established benefits and values, we continually run into a number of what might be called urban myths regarding running SAP HANA on VMware vSphere. Let's consider and respond to them in some detail:

- *That SAP HANA implementations are limited to 1TB in size.* **False.** It is true that the largest virtual machine that can be created with vSphere 5.5 is 1TB. But depending on the temperature of the data and use case, warm and cold data can reside together on disk, thus extending the total size of the SAP HANA database beyond 1TB.
- *That if SAP HANA is implemented, its host system can't support the consolidation of other applications and/or virtual machines besides SAP HANA.* **False.** VMware and SAP have numerous examples of how they successfully support customers running SAP HANA along with other applications on single-host systems.
- *That solvable technical or engineering challenges related to virtualized SAP HANA are actually architectural limitations.* **False.** All too often, IT organizations assume that challenges they run into are somehow unsolvable facts of life related to the hardware/software at hand. Instead, customers can usually find a way around problems with the help of skilled VMware or SAP engineering consultants.
- *That virtualization/abstraction inevitably leads to conflicts within traditional IT organizations, and that virtualizing SAP HANA compounds those problems by spreading discord to DB/analytics admins.* **False.** While it's true that data center roles are evolving, that has always been the case. As new innovations arise, IT organizations adapt. That was true when VMware first became a data center mainstay and we believe the same will be true as virtualization extends into new applications and use cases, including analytics and SDDC scenarios.
- *That virtualization "overhead" severely degrades the performance and ROI of solutions, including SAP HANA.* **False.** This is an issue where context means everything. Yes, abstracting a workload with vSphere can impact overall performance, typically by about 10%. But in the case of virtualized SAP HANA, the practical effect is miniscule. In laboratory research cited by VMware and SAP engineers, the difference was between 15 seconds for an unvirtualized query response and 16.5 seconds for the virtualized response. In stark contrast, a conventional BI system used in the project took 77 minutes to deliver the same findings.
- *That functional errors are more common in virtualized environments than physical environments, and data recovery is not supported.* **False.** If this were true, vSphere and similar solutions would be failing in the market, not becoming core components of data centers worldwide. It should also be noted that as part of their continuing SDDC development efforts, VMware and its partners are optimizing all critical data center processes for vSphere environments. Finally, in well over 2 years of intense testing at SAP's facilities in Walldorf, Germany, not a single functional error was uncovered running SAP HANA on vSphere.
- T*hat vSphere vMotion is incompatible with SAP HANA.* **False.** So long as a client is following VMware and SAP's best practices guidelines in terms of system sizing, deployment and management, vSphere vMotion can be successfully used in vSphere-virtualized SAP HANA environments.

- *That customers can ignore suggested best practices and still achieve optimal SAP HANA results across compute, storage and network.* **False.** VMware and SAP have teamed to remove any complexities associated with the virtualization of SAP HANA. Both companies have invested considerable assets in formulating best practices designed to support optimal results. Customers are well-advised to follow those guidelines.
- *That SAP HANA can't be scaled-out effectively.* **False.** It is entirely possible to deploy SAP HANA in scale-out (multi-node) environments. In fact, vendors, including Cisco, Dell, Fujitsu, Hitachi, HP, Huawei and Lenovo all sell scale-out SAP HANA offerings (for specific details, see here and here). However, these solutions have not been validated yet between SAP and VMware for virtualized workloads so they do not support SAP HANA running on vSphere yet. SAP's public virtualization roadmap targets early 2015 for supporting SAP HANA in scale-out environments on vSphere.
- *That virtualizing SAP HANA requires fundamental changes in operational processes and functions, resulting in longer time-to-market, higher costs and resources.* **False.** In vSphere environments, SAP HANA is simply another application running on a VM or VMs. So long as the supporting assets and dependencies are appropriate, SAP HANA will run as successfully as any other virtualized workload. In addition, leveraging vSphere automation processes can significantly reduce labor requirements and costs in these implementations.

Running virtualized SAP HANA in the real world

Urban myths aside, what can organizations expect from virtualizing SAP HANA with VMware vSphere? Following are examples of companies that implemented and profited from these implementations:

- After replacing an aging, highly customized ERP system with a fully virtualized SAP ERP solution in production, a US-based IT vendor implemented SAP HANA with a sidecar system supporting operational reporting. After that success, the company decided to pursue a virtualized deployment of SAP Business Processing and Consolidation (BPC) on SAP HANA that it believed would be considerably faster than its traditional Relational Database Management System (RDBMS) platform.

  The company developed a comprehensive plan to migrate its RDBMS system to SAP HANA virtualized with VMware vSphere. It initially thought the effort would take a year to complete but discovered that the process was less costly and time consuming than expected. The BPC migration succeeded, and along with providing internal IT users and customers optimal quality of experience, the company captured other notable advantages from its migration to vSphere and SAP HANA:

  - ◊ 400% gain in performance compared to the prior RDBMS system
  - ◊ Improved agility and flexibility, along with quicker responses to evolving market conditions
  - ◊ Embedded automation and high availability features thanks to VMware vSphere

- Freeing IT staff to shift their focus from day-to-day operational chores to higher value projects

The company plans to continue virtualizing its entire SAP environment, and feels confident in using VMware vSphere and SAP HANA to dependably support significant, cost effective gains in application and workload performance.

- A European maker of customized automobiles was looking for ways to improve the efficiency and costs of the testing procedures it applies to every new engine. After investigating the potential benefits of specific technologies, the company deployed a real-time quality assurance platform supporting a vSphere-virtualized implementation of SAP Business Suite powered by SAP HANA that harnessed an array of engine sensors and SAP Predictive Analysis software.

  The results? With the new vSphere + SAP HANA system, the run time for testing unsuccessful engines is 94% faster than before, allowing the company to capture the equivalent of an extra day of testing capacity every week. In addition, internal costs are lower and engineers have more time to focus on refining product quality and customization. That has also improved customer satisfaction, and the company enjoyed its most successful year to date after implementing the new vSphere + SAP HANA engine testing solution.

Final analysis

It is reasonable to consider enterprise IT as a continuum where technological advances are paced by improvements in commercial computing solutions, with business customers reaping the resulting benefits. That has certainly been the case during the ongoing evolution of system virtualization and we believe it bodes well for emerging SDDC technologies.

But sophisticated solutions like VMware vSphere also deliver the goods for complementary technologies, including SAP HANA. In fact, the evidence provided by VMware and SAP, their hardware vendor partners and numerous satisfied customers suggests that virtualization provides the means for SAP HANA's in-memory analytics capabilities to reach their innovative, logical best in clients' production environments.

That success and the resulting attention have, in turn, led to a number of urban myths springing up around vSphere-virtualized SAP HANA that cannot obscure the significant advances and real-world benefits resulting from VMware and SAP's continuing collaboration.

All in all, it is our opinion that organizations considering or pursuing the implementation of in-memory database technologies would be wise to investigate SAP HANA and VMware vSphere virtualized solutions.

About Pund-IT, Inc.

Pund-IT™ emphasizes understanding technology and product evolution and interpreting the effects these changes will have on business customers and the greater IT marketplace. Though this report was developed with the cooperation and support of VMware and SAP, the opinions expressed are those of the author and do not necessarily represent either company's position.