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SAP 2014: Reaching for the Cloud

It was January 21, 2014 and Bill McDermott had just stepped off the stage at SAP AG's 2014 investors meeting in Walldorf, Germany. McDermott and the executive team had announced the fourth straight year of double-digit growth for the company.

SAP's technology and its ability to create new areas of business process expertise for new applications were instrumental in making the firm the world's leader in the Enterprise Resource Planning (ERP) field.[1] The company's stock was near record levels and the investor community and the Supervisory Board were pleased with the work McDermott and his co-CEO Jim Hagemann Snabe had done since they assumed control in 2010. McDermott and Snabe had recently announced a change to their partnership: Snabe would be nominated to the company's Supervisory Board in May 2014, at which point McDermott would become the sole CEO.

In 2010 the co-CEOs had initiated a company-wide strategy aimed at doubling the company's addressable market and aggressively driving top-line growth. The essence of the strategy was to continue growing SAP's core market categories of enterprise applications and analytics, while adding three new technology categories that were radically changing how business was conducted: mobility for business, in-memory computing and cloud computing. The strategy had paid off—so far. By the end of 2013, revenue in each of the new categories had grown by over 50 times. In addition, SAP had developed SAP HANA, an in-memory computing technology that combined database, data processing and application platform functionality, and was becoming a threat to traditional database vendors. Looking ahead to 2014, McDermott and Snabe hoped to use SAP HANA, which empowered users with the functionality to conduct real-time data modeling and analytics, as a platform to transition SAP into a cloud-based company and make all of SAP's products available to customers as cloud offerings. The strategy effectively transformed SAP from a traditional software provider to a cloud service provider. SAP's cloud strategy appeared to be working. Financial numbers which had just been announced at the investor's meeting showed that non-IFRS (International Financial Reporting Standards) cloud subscription and support revenue had reached €787 million in 2013, surpassing the full year guidance by €37 million. Cloud division revenue had reached €266 million in Q4 of 2013 alone.

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McDermott had widespread support from the board to push the cloud transition further, but much still had to be done. Ownership of cloud infrastructure was a key question. SAP could build, own, and operate its own data centers, or partner to locate SAP HANA and other products with other cloud infrastructure providers, such as Amazon, Microsoft, or IBM. McDermott reviewed reports that estimated the return on investment (ROI) of various datacenter options, but had to determine how the various tradeoffs affected SAP during its transition. Other questions revolved around the organization and leadership of the cloud efforts.

SAP Background

Early History (1972-1995)[2]

Founded in Mannheim, Germany in 1972 by a small group of programmers originally from IBM, SAP staked out new ground in the automation of business processes, with a commitment to developing off-the-shelf applications that would be cheaper and more quickly installed than the customized solutions the big companies were then pursuing. Over the next three decades, SAP developed software that aimed to keep pace with fast-changing technological developments and client needs. Its first offering, R/1, was aimed at automating companies' accounting functions.

By 1980 SAP offered a mainframe database[a] (R/2) application, which was replaced a little more than a decade later by a client/server[b] version (R/3). R/3 could automate all of an enterprise's business processes, from manufacturing to finance to human resources. It was the promise that companies could control resources and their allocations across complex enterprises that gave the software its name, enterprise resource planning, and made SAP an indispensable purchase all over the world. Over the years, SAP's solution suite grew to include applications for supplier relationship management, customer relationship management, supply chain management, and product lifecycle management, in addition to ERP. (See **Exhibit 1** for core software applications of SAP Business Suite.)[c] SAP also began to build and integrate industry-specific functionality to better enable its customers to use the applications for their specific needs in industries such as aerospace and defense, consumer products, chemicals, and others. Given its software's popularity and the demands increasing growth made on its own resources, SAP focused [largely] on product development, leaving installation and customization to system integrator (SI) partners and its consultants, whom it would train and certify. The SIs typically charged more for their services than companies paid for their licensing fees- sometimes more than four or five times the licensing fees. However, the "solutions," as attempts to make complex situations simple, became themselves fraught with

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[a] Early computer systems, including the UNIVAC, IBM 750, IBM 1401, IBM System/360, and System/370 were classified as mainframes. These computers were very powerful, very large and very expensive. A typical mainframe was made of several units, each about the size of a refrigerator, that were housed in a large, dedicated, temperature-controlled room that was staffed with specially trained engineers and operators. As technologies improved, the mainframe became a powerful tool for many corporate departments including accounting, payroll, engineering and production scheduling. Source: Marco Iansiti and Alain Serels, "Microsoft Server & Tools," HBS No. 613-031 (Boston: Harvard Business School Publishing, 2013), p. 3. Note: footnote explanation not in original case (HBS No. 609-069).

[b] Shortly after PCs became standard issue in each office, users began to look for ways to share information with one another without using floppy disks. Initial solutions consisted of directly connecting PCs to one another to form a network . . . since the middle of the 1990s, the client/server architecture had become the standard that enabled private enterprise networks and the public network behind the Internet. . . . Source: Marco Iansiti and Alain Serels, "Microsoft Server & Tools," HBS No. 613-031 (Boston: Harvard Business School Publishing, 2013), p. 3. Note: footnote explanation not in original case (HBS No. 609-069).

[c] Exhibit not in original case (HBS No. 609-069).

technical incompatibility, as individual functions tended to pursue their own approaches. Overall (i.e., enterprise-wide), integration often became very challenging.

The Internet Years (1995-2002)[3]

The Internet exploded in the 1990s and the model for enterprise software began to change once again. Internet startups challenged the business model of both SAP and SAP's customers. A nexus of industry stalwarts like IBM, Microsoft, and venture capital-backed startups pushed open protocols and web services as the holy grail of software integration. IT customers could now, supposedly, eschew fully integrated solutions from a few providers and instead use "open" standards-based technologies to mix and match data and services and develop "best-of-breed" application solutions in a rapid manner. The focus, in this new world, was on flexibility via open protocols, standards, and languages that all aimed to enable a painless exchange of data, anywhere anytime, in contrast to systems where information might be able to flow relatively freely within the enterprise but have considerable difficulty getting beyond it.

Other trends also had their origin in this period. One was the increasing use of outsourcing, which blossomed into off-shoring, and the rise of enterprises like Wipro and Infosys (in India) that managed the work and workers. It was in fact the "rationalizing" of business processes, enabled by ERP applications, that led organizations to assume that these activities could be coherently performed beyond the firm's boundaries and at dramatically less cost. Meanwhile, in conjunction with that trend was an increased emphasis on what was "core" and "peripheral" to the firm, and where "competencies" lay. This set up, within organizations and as a part of their enterprise resource planning, had the potential of making some of an enterprise's functions and processes more important than others. This caused many organizations to embark on integrating internal IT systems with external suppliers, customers, and markets. Driven by the demand for Business-to-Business (B2B) market exchanges, IT systems now not only had to become good at integrating internal information but also seamlessly connecting with external providers.

The rise of the Internet and the trend toward outsourcing created two interrelated results. First was the rise of specialized, best-of breed vendors who developed function-specific software that operated in tandem with a company's ERP system. Second was the growing awareness that IT itself was a potential source of differentiation. As such, a firm would want to have something beyond the "best-of suite" that was, by virtue of licensing fees, basically available to anyone. That differentiation was becoming more possible not only via a host of new vendors using "flexible" technologies, but also because organizations were often becoming more technologically fluent themselves—at various levels. The dreaded advent of year 2000 ("Y2K"), when potential dating problems (i.e., old systems were not set up for a year that began with "2") would grind the planet to a halt, prompted massive reevaluations of IT policies, strategies, technologies, and purposes. At the same time, employees had themselves become far more sophisticated, as a generation raised on video games, personal computers, and, increasingly, the web and Internet, joined the workforce.

As the Internet continued to evolve and play a greater role in SAP's application development, the company began to enhance their offerings and to embrace tools and interfaces that would make the user experience more like their everyday computer usage experience with joint offerings from Microsoft and others. As customer usage continued to mature, SAP recognized a demand and opportunity to enable customers to optimize the data and information within their SAP systems for analysis and strategic decision making. Working with partners and through development, the company focused on bringing strategic insight capabilities to customers.

For SAP, these factors, and a growing consolidation of the ERP industry itself, triggered a hunt for increased sources of growth. One decision the company took was to pursue the small and medium-sized enterprises (SME) market; another, equally important tack was to meet the software flexibility issue head on.

The SAP Business Platform (2002-2010)[4]

In the new century, with the consolidation of the enterprise software market, SAP decided to strengthen its leadership position by adopting a platform strategy, which had proven very successful in the technology industry before (e.g., Windows, Intel). SAP wanted to create a platform that could be the basis for further application software innovation by third party independent software vendors (ISVs) that would both benefit its customers and enhance its market position. In 2003, SAP revealed its NetWeaver based platform, which foreshadowed its new role as the hub of a complex software ecosystem where SAP customers, traditional system integrator partners, and independent software vendors thrived and interacted with each other using SAP's platform and technologies. The platform strategy was SAP's attempt to achieve the holy grail of interoperability and reusability both inside and outside of its customers' enterprises.

Hasso Plattner, SAP's co-founder and co-CEO through the Internet turmoil, responded to these challenges by convincing SAP's Board in the spring of 2002 that the company's future lay in embracing an open architecture strategy and by converting SAP from a software application provider to an open-standard based platform. In early 2003, SAP announced its NetWeaver composition and integration platform that encompassed SAP's prior investments in traditional proprietary ERP technologies based on the ABAP programming language and the more recent open web-based technologies like IBM's WebSphere, Microsoft's .Net, and Sun's Java programming language. These investments were a first step to build an application platform, called "SAP Business Process Platform," which promised to deliver an environment that allowed for the composition of new user-based enterprise services that seamlessly leveraged SAP's core applications and the fast evolving web-based technologies

The move to the application platform was not just technological but also organizational. SAP had long pioneered working with SIs like Accenture, Deloitte, or IBM to help clients customize and install SAP systems—however, software functionality was still developed internally. The application platform strategy changed this dynamic as now "anyone" could leverage SAP application functionality and create new applications on top of it. SAP's challenge was now to attract and work with independent software vendors, SIs, and customers in ways that it had not done before.

The concept of community was core to the SAP ecosystem. Clearly, vast knowledge about how businesses ran SAP software resided outside of its own borders. Access to this knowledge could be critical to both customer and partner effectiveness. The best way to unlock this knowledge was to enable the various members of SAP's ecosystem to interact with each other.[5] As a result, SAP established communities of innovation in 2003. SAP communities spanned individuals and companies and the technical and business domains.[6] Communities offered members a platform to share problems and solutions, and develop innovative new ways to utilize SAP software.

For example, the SAP Developer Network (SDN) exemplified the power of communities and the individuals in the ecosystem to self-organize and create value for each other . . . Members contributed more than 5,000 posts per day in over 180 SAP hosted discussion forums which received more than 500,000 unique visitors per month. The median response time to a question on a technical forum was less than 20 minutes. Most of the responses came from other community members and not SAP

employees; most questions received two to three responses and over 85% of the questions were deemed "answered" by the original poster.[7]

Competitors

SAP was the ERP industry leader with a 26% market share and 232,000 customers. The average ERP project cost $2.55 million, took 18.5 months to fully implement and had a 23 month payback period. An industry survey found that 19% of SAP customers engaged with the company's software in the cloud compared to 81% that implemented on their own premises.[8] (See **Exhibit 2** for company financials.) SAP's major competitors included:

Oracle Began as a database systems company and utilized acquisitions to supplement an internal transition to ERP. In 2004 Oracle acquired PeopleSoft and the following year acquired Siebel Customer Relationship Management (CRM). Oracle's E-Business Suite (EBS) covered ten different product lines with multiple modules in each. Oracle provided solutions through on-premise and on-demand deployment models. According to an industry survey, in 2013 Oracle had a 17% market share. Customer projects averaged $2.25 million, 22.5 months to fully implement, and had a 16 month payback period. Customers consumed 28% of software in the cloud compared to 72% on-premise.[9]

Microsoft Dynamics Microsoft entered the ERP market in 2000 with the acquisition of accounting software firm Great Plains. Additional acquisitions led to a 2013 ERP market share of 11%. Average project costs were $1.8 million, took 12.5 month to implement, and had a 24 month payback period. Twenty-nine percent of Microsoft Dynamics' software was implemented in the cloud compared to 71% on-premise.[10]

Salesforce.com Founded in 1999, Salesforce.com did not compete in the entire ERP market, but was the industry leader in CRM software (a component of ERP software). Salesforce.com's CRM software had a 2012 market share of 14% and reported sales of $2.5 billion. Comparatively, SAP's CRM software had a 12.9% market share ($2.3 billion in reported revenue); Oracle's had 11.1% market share ($2.01 billion in reported revenue); and Microsoft Dynamics' CRM software had a 6.3% market share ($1.1 billion). Salesforce.com was a pure-play cloud company.[11]

Cloud Computing

As defined by the National Institute of Standards and Technology (NIST), an agency in the U.S. Department of Commerce, cloud computing was "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing services (e.g., network, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."[12]

As the costs of acquiring, maintaining and operating servers[d] grew, large companies looked for ways of improving server efficiency. Companies generally ran only one application per server, maintained enough capacity to handle peak periods and allowed for redundancy in case the server malfunction[ed]. The result [was] that server utilization was generally very low, with estimates varying from 5% to 20% of capacity.[13]

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[d] "Servers were powerful centralized computers that enabled clients to communicate with one another, access shared data, and leverage additional computing power." Source: Marco Iansiti and Alain Serels, "Microsoft Server & Tools," HBS No. 613-031 (Boston: Harvard Business School Publishing, 2013), p. 2. Note: footnote explanation not in original case (HBS No. 609-069).

Virtualization, first introduced to servers in 1999 by startup VMware, shared server computing resources among more users and applications, and thus allowed for increased server utilization.[14] With virtualization, users within a company could access the computing resources of many separate servers, wherever excess capacity exist[ed]—the entire server network thus became an as-needed service.[15]

The major change with cloud computing was that IT was supplied as an on-demand, pay-per-use service, usually provided over the Internet. The hardware remained similar as in a client/server system, but instead of buying and housing the servers on-premise, the servers were owned and operated by a service provider that sold units of activity performed by the server.[16] Cloud computing had five essential characteristics (**Exhibit 3**), three service models, and four deployment models.[17]

Service Models

Software as a Service The most common type of cloud service, Software as a Service (SaaS), enabled consumers to use applications stored and operated on a provider's cloud infrastructure.[e] The consumer of the software did not have responsibility for the maintenance and operation of the cloud infrastructure, and could access the software from a variety of client devices, such as a web browser or program interface.[18] Common web browser-accessed SaaS products included Google's Gmail, Facebook, and Netflix. SaaS enterprise application providers included salesforce.com, Google, Microsoft (Office 365), Intuit (Quicken Books Online), and Dropbox.[19]

Platform as a Service The capabilities of Platform as a Service (PaaS) enabled the consumer "to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider."[20] Similar to SaaS, consumers did not operate or manage the underlying cloud infrastructure. However, consumers controlled the actual applications deployed on the infrastructure.[21] PaaS providers included Google's App Engine, Microsoft's Windows Azure, salesforce.com's force.com, OpenStack, and Appistry.[22]

Infrastructure as a Service The capabilities encompassed in Infrastructure as a Service (IaaS) allowed consumers "to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications."[23] As with PaaS, consumers did not operate or manage the underlying cloud infrastructure, but controlled the operating systems, storage, and applications.[24] IaaS providers included Amazon Web Services, CA Technologies, AT&T, Verizon, Rackspace, and BlueLock.[25] (See **Exhibit 4** for comparison of traditional IT, SaaS, PaaS, and IaaS.)

SaaS, PaaS, and IaaS were defined as public clouds—infrastructure shared among multiple consuming firms. But private clouds—infrastructure dedicated to a single consuming firm—also existed.

Major concerns regarding cloud computing had dissipated since its introduction, but certain user fears still remained and hindered a wider embrace of cloud services. Foremost among these concerns

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[e] "A cloud infrastructure is the collection of hardware and software that enables the five essential characteristics of cloud computing. The cloud infrastructure can be viewed as containing both a physical layer and an abstraction layer. The physical layer consists of the hardware resources that are necessary to support the cloud services being provided, and typically includes server, storage and network components. The abstraction layer consists of the software deployed across the physical layers, which manifests the essential cloud characteristics." Source: Peter Mell and Timothy Grance, "The NIST Definition of Cloud Computing," National Institute of Standards and Technology, U.S. Department of Commerce, Special Publication 800-145, September 2011, http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf, accessed January 2014.

were the issues of privacy and availability. Many firms possessed sensitive data and preferred to retain complete control, which was lost with the use of cloud services. Additionally, if a cloud service experienced a service interruption then a firm could not access its data and could do nothing to remedy the situation.

Economics

Forrester Research forecasted 2020 market sizes for SaaS ($132.57 billion), PaaS ($11.91 billion), and IaaS ($4.78 billion).[26] (See **Exhibits 5a, 5b** and **5c** for the growth dynamics of SaaS, PaaS, and IaaS.) The private cloud market was expected to grow from $7.8 billion in 2011 to $15.9 billion by 2020.[27] Forrester recognized significant sustainable growth opportunities for SaaS, but expected market saturation after 2016. The IaaS market, the second largest public cloud market after SaaS, was expected to reach peak global revenue in 2014 and "then enter a period of significant commoditization, price deterioration, and margin pressure."[28] The market was then expected to stagnate and decline between 2014 and 2020.[29]

Infrastructure and Data Centers

Pooling and standardizing IT resources through a cloud infrastructure enabled centralized data centers to capitalize on economies of scale. According to Microsoft research this included: supply-side savings (larger data centers decreased the cost per server), demand-side aggregation (reduced variability and increased server utilization rates), and multi-tenancy efficiency (reduced application management and server cost per consumer).[30]

This research suggested that "for large agencies with installed base of approximately 1,000 servers, private clouds are feasible but come with a significant cost premium at about 10 times the cost of a public cloud for the same unit of service, due to the combined effect of scale, demand diversification and multi-tenancy."[31] (See **Exhibit 6** for cost benefit of a public cloud.) Research firm IDC predicted "spending by service providers on IT infrastructure for the public will grow at a compound annual growth rate (CAGR) of 15.3% and reach $11.3 billion in 2016."[32] Private cloud spending was projected to grow at a CAGR of 16.2% and reach $11.0 billion in 2016.[33]

SAP 2010 - 2013: Expanding the Addressable Market

McDermott and Snabe joined the SAP Executive Board in 2008 as the company rose out of the global recession. Two years later the men were named co-CEOs. They shared responsibility for strategy, governance, corporate development, innovation, communications, and marketing. McDermott had the additional responsibility for sales and ecosystem activities, and Snabe focused on products and solutions development. Together, they drove the development of a new corporate strategy. "Bill and I are very different from each other, but because of the co-CEO model we have been able to complement each other in very unique ways," said Snabe.

The New Strategy

In the early 2000s much of SAP's corporate strategy focused on the company's core—building applications and analytical capabilities—but the company's strategic direction began to expand in the latter half of the decade and culminated in an articulated strategy of platform development and transitioning to the cloud. (See **Exhibit 7** for strategy slide.) The new strategy remained dedicated to growing the core business, and at the same time doubled the company's addressable market by focusing its product portfolio across five market categories: applications, business analytics, database

and technology, mobile, and the cloud. When McDermott and Snabe announced the new strategy in April 2010, SAP was the market leader in applications and business analytics. With the new strategic focus, McDermott and Snabe were determined to achieve similar positions in the mobile, database and technology, and cloud categories.

The strategy also included defined goals for 2015. McDermott and Snabe sought to achieve €20 billion in revenue, with a 35% non-IFRS operating margin;[f] 1 billion users of SAP software; build a €2 billion cloud business; and continue its position as the fastest growing database company.

The approach to achieving these goals relied primarily on organic innovation. "To truly become a cloud company, we had to speed up our innovation process, because it is essential to market leadership. We have to stay relevant in a market that moves at a pace faster than it did in the past," said Snabe. He added, "How do we change the way we build software? We have to pace ourselves like a startup, but leverage our enormous global scale." In 2009, using a traditional waterfall development process, SAP spent, on average, 14.6 months[g] between new product (or new versions) cycles. According to Snabe, this compared to a six-month average cycle for startup companies, and an even faster timeline in the cloud industry. To formalize a stronger innovation process for SAP, Snabe studied a multitude of innovative companies, "and spent an enormous amount of time rolling up my sleeves and playing team member to better understand what was needed." In 2010 Snabe launched an agile and lean principles innovation pilot with a variety of projects to expedite the time to market and time to consumption.

The pilot quickly proved successful. SAP saw a dramatic improvement in the products' relevance for the consumer from the outset, a radical increase in product quality, and a faster time to completion. It took a significant team-first mentality to achieve success. Software architects historically liked to define optimal architectures before any coding was done, so they had to become more comfortable with the idea of prototyping. Product managers had to give up some of their control, and instead work more closely with the development team and, most importantly, the customer. Snabe also identified strong change agents within the organization that believed strongly in the lean and agile principles, and could help champion his vision.

An aggressive acquisitions strategy supplemented SAP's focus on faster innovation cycles. In May 2010 SAP acquired Sybase for $5.8 billion. Sybase specialized solely in information management and mobile data use and was the industry leader in both categories. Sybase remained an independent company, but provided SAP with the mobile engineering talent needed to achieve continued success in the category. As mobile devices proliferated, customers required ease of access to data via multiple devices in real-time. This need led to a redesign of software for better mobile viewing and potential security issues.

In December 2011 SAP acquired SuccessFactors for $3.4 billion. At the time of the acquisition, SuccessFactors was the leader of the cloud-based human capital management (HCM)—a core software in ERP— solutions market. In May of 2012, SAP acquired Ariba for $4.3 billion. Ariba was the world's largest web-based B2B commerce network. According to SAP documentation, "businesses of all sizes use the Ariba Network to connect to their trading partners from any Internet-connected computer or mobile device to buy, sell, and manage their cash efficiently and effectively."[34] Deepak Krishnamurthy, SAP's head of corporate strategy, reflected on the acquisition,

[f] McDermott announced at the investor's meeting that the goal of achieving a 35% non-IFRS operating margin would be moved to 2017 in order to capture the growth opportunities in the cloud.

[g] In 2013, SAP reduced its average cycle time to 7.4 months.

"The Ariba network was huge value. The network business model is all about transaction based pricing, getting suppliers and buyers to transact on the network. And today we have close to $500 billion in commerce on the network."

Krishnamurthy also reflected on the broader strategic approach undertaken in 2010, stating:

> We knew we had to get into mobile, in-memory, and then cloud. This was the strategy articulated in 2010. We drove cloud innovation internally, but building a cloud solution is much different than building an application, which we had great experience successfully completing. Cloud is a DNA challenge, not just a software challenge. That is why we acquired SuccessFactors and then Ariba. Ariba had been through an on-premise to cloud transition themselves and that experience was attractive to SAP. Our current transition is an extension of the one that has been happening since 2010. The business model transition reflects the decision that cloud was going to become a more important aspect of our solution portfolio.

Snabe appreciated the difficulty of successful, healthy companies undergoing major strategic changes. "The hardest thing in business is to change a company that is not in a disastrous place. We did not have a sense of urgency because of the strength of our core products and our commitment to growing those segments. We had to inspire our teams with a new opportunity and not a threat. The co-CEO model helped accelerate the pace of change because we could divide and conquer," he explained.

SAP HANA

SAP HANA represented the driver behind the new strategy and the continued success of the company's core. The development of SAP HANA began with a collaboration between SAP and the Hasso Plattner Institut, a university center focused on IT systems engineering, founded by Plattner. An early in-memory database prototype had been developed at the Institute. Krishnamurthy explained, "HANA was the result on an incredible collaboration between SAP and HPI to radically change how databases could be architected." As the prototypes became more advanced and the needed hardware became more sophisticated and less expensive, SAP put more resources towards the development of a commercialized in-memory database.

SAP HANA was released in 2010 and the first customers fully implemented the platform starting in 2011. The SAP HANA platform offered real-time analytics and applications utilizing an in-memory approach. It enabled organization to analyze business decisions based on disparate and large quantities of data. Additionally, by eliminating aggregates and relational table indices common in traditional databases, SAP HANA could reduce the total cost of ownership relative to other platforms. (See **Exhibit 8a** for SAP HANA platform overview, **Exhibit 8b** for SAP HANA intersection with SAP products, and **Exhibit 9** for SAP products powered by SAP HANA.) SAP HANA enabled real-time analytics (e.g., On Line Transaction Processing (OLTP) and On Line Analytics Processing (OLAP); big data warehousing; and predictive, spatial and text analytics), real-time applications (e.g., consumer engagement, sense and respond, planning and optimization); and real-time platform capabilities (e.g., application platform services; integration and data virtualization services; mission-critical deployment services). SAP HANA performed real-time analytics on both structured and unstructured data.

SAP HANA powered many of the company's 3,000 products in the five key market categories. It was an open platform that was adaptable and extensible. Customers and ISVs could create custom applications on SAP HANA depending on their needs. SAP HANA Cloud Platform was an

additional PaaS offering, which enabled customers to leverage the SAP HANA platform on an as-needed and scalable basis and build application extensions or new applications leveraging the PaaS functionality.

SAP's product development organization was also driving a major change to promote a new approach to user interface design and product deployment. Synching with HANA's real time analytics philosophy, SAP had invested in the development of a variety of easy to use, traditional and mobile applications that made it easy to scroll through inventory reports or perform predictive sales analytics.

The commercialization of the SAP HANA Cloud and the new generation of easy to use applications led to a number of new opportunities and customers for SAP.

City of Boston, Massachusetts: In 2012, SAP partnered with the City of Boston, to improve public services and provide citizens with insight into the city's performance. Boston city leaders were committed to running the city efficiently and transparently, and sought to improve their long-standing performance management program called Boston About Results (BAR). BAR, a public website that outlined departmental initiatives and performance metrics, let both city officials and the general public keep track of what the city was doing.

With implementation help from CIPHER Business Solutions, Boston had a full-scale roll out of the SAP program within one year of purchasing the software, meeting both time and budget goals. The SAP system enabled the city to track over 2,000 key performance indicators (KPIs) on a monthly or quarterly basis and to implement a common performance tool across 45 departments, allowing Boston officials to tie performance to strategic goals and to improve city services. The SAP program not only allowed individual departments to analyze their progress on specific projects, but it also gave the public access to 16 departmental performance scorecards on the BAR website. For instance, citizens could visit the Basic City Services Scorecard and see that the city responded to over 96% of the pothole service requests within their 48-hour target. SAP also worked with the city to develop the mobile app version of BAR called CitizenInsight, and later employed other SAP services such as SAP Data Services software, business intelligence solutions, and the SAP HANA platform, to gather and analyze information on problematic properties.

National Basketball Association: SAP became the Official Business Analytics Software partner of the National Basketball Association (NBA) in 2012. The NBA wanted to drive greater engagement among its millions of fans by maximizing the use of player statistics. SAP partnered with the NBA to develop a single interactive website, powered by HANA, for fans to analyze statistics. (See **Exhibit 10** for Web portal.) Game statistics were uploaded to the database in real time and it contained over 65 years' worth of historical data. It was vitally important to the NBA leadership that the website enabled close engagement with fans and allowed fans to feel close to the game and players. The statistics page on the NBA.com saw a 60% increase in site visits around the launch of the season vs. the previous year and the system was robust enough to handle up to 20,000 concurrent users.

Krishnamurthy commented on the future of SAP HANA: "Everything will run from the HANA platform which will serve as the integration layer between old SAP products and the new cloud-based products. This will enable us to take our software off a customer's data infrastructure and move it to the cloud. This will drive faster consumption of the cloud model and leverage HANA for integration." Snabe added, "We came from a world with many platforms, which caused us to lose some of our consistency. We knew we could not return to a single platform for everything because of

changing market demands. We view HANA as the platform of the future, and foresee every application and solution to be built to run on HANA. This allows for a massive simplification."

Business Model Transition

Client/server business models were typically perpetual licenses for the operating system and application software that averaged in the hundreds of millions of dollars. The one-time, upfront license fee deals were normally negotiated between SAP sales representatives and the customer's chief information officer (CIO). SAP deployed direct sales organizations to sell traditional on-premise software packages. Sales-go-to market strategies were developed at the corporate level, but regional sales organizations had the ultimate responsibility to adjust and implement the model for their specific region. SAP also employed "independent value-added resellers," and partnered with independent system integrators, telecommunication firms, and hardware providers.

With an 18.5 month average installation time, on-premise software packages were not consumed by the ultimate end user at the time SAP recognized economic value from the deal. Additionally, software upgrades typically existed before the final implementation, so customers were not always running the latest software packages. The distributed on-premise model also made it difficult to continuously ensure customers were running the most up-to-date version.

The transition to a cloud computing business model and SAP HANA would drive significant changes to SAP's pricing mechanism. Cloud-based solutions were sold under subscription-based licensing agreements that enabled customers to pay for what they used. These deals were typically negotiated between a cloud-specific sales representative and the end user of the product, as opposed to the CIO. According to Morgan Stanley analysts, for a software provider, subscription based payments reduced short-term earnings but increased visibility and the lifetime value of the customer. Further, the subscription model reduced the incidence of discounting standard in licensing deals.[35]

SAP in 2014

As the calendar flipped to 2014, SAP's operating profit from the cloud grew, and annual cloud sales were on track to reach €1 billion by the end of the year. Thirty-three million business users were connected to the SAP Cloud (more than any other enterprise Cloud company), and more and more of SAP's products were moving to the cloud. However, despite the early success of the strategic transformation, difficulties remained.

"We want to accelerate the speed of consumption so the customer is more willing to buy new products," said Krishnamurthy. Complications arose, however, because of the unaligned recognition of economic value for SAP and its customers. Jonathan Becher, SAP's chief marketing officer (CMO), explained the difficulty:

> As a cloud company, our goal is to enable customers to get economic value from the solutions at the same time we do. Because of the long deployment times, we are trying to reduce the time from the moment someone not involved in the purchase starts to gain value. Deployment times historically have averaged two to six quarters depending on product. The goal of the cloud model is to get deployment down to two to six weeks. One of the challenges of the on-premise model is that we can never catch up. To use CRM, which has over 30,000 installs as an example, it takes three to four years to get upgrades to everyone in the current deployment model. The cloud enables us to push these upgrades out overnight, but this can present an innovation problem. We are really

good at innovating, but the old business model limited consumption of these innovations.

> The thought process of how the idea-to-delivery-time model works needs to change. The traditional model takes many months to decide what to do and then many months to develop the product. With this model we have to pack as much functionality into that first package because it takes so long to get upgrades in. With cloud, we do not need to spend as much time on the front end. We can see how customers use the solution and then we can experiment live. The idea-to-delivery time gets condensed from years to months. Functionality doesn't matter if the business model doesn't let customers get to the solution.

Organization

With the decision to make cloud ubiquitous throughout SAP, McDermott believed that cloud strategies belonged in every business unit and not as a separate entity. However, achieving alignment between the entire SAP organization and the new business model remained a work in progress. SAP restructured all of the development organizations under Vishal Sikka, and formed a single sales team that combined the former cloud and on-premise sales teams. "We are trying to deliver consistency and simplification for pricing and discounting, yet still leave much control with the regional sales base. Cloud sales are entirely different from on-premise, but the right incentives will drive cloud sales at SAP," said Krishnamurthy.

Externally, the company's brand was undergoing a transition as well. "We have reoriented our focus on this notion of the gap between the brand and the experience of the customer. Previously we had the luxury of issuing a license and wiping our hands of it. Then it became an issue for the systems integrator or the customer's IT department," explained Costanza Tedesco, senior vice president, brand experience (HBS '93). "Now that we own the software and help the customer consume the software, we have to be more aware of our brand experience. This is a huge culture shift for us at SAP," she added. Becher added, "Increasingly, the majority of what we are doing is about enabling our customers to be customer intimate and to better engage with their customers. This is harder to quantify than our historical focus on operationally efficient solutions, and so we increasingly seem like a B2C company in how we operate and not as a B2B."

The brand transition was hindered by the complexity of SAP's web presence, which contained numerous websites for the thousands of products offered by the company. "We are ranking our websites and tracking their metrics. We will get rid of underperforming websites that do not provide business value. We have a massive product portfolio, but we need to simplify because we cannot have 3,000s PDFs on the website," explained Maggie Fox, senior vice president, digital marketing. She added, "We do not need a confusing digital experience. We have to understand how to market differently when it comes to cloud products."

Using online resources, reviews from IT professionals, and previous use of SAP software, customers typically completed 60% of the purchase decision process before ever speaking with an SAP representative. The added complexity of SAP's web presence made it even more difficult to attract customers to SAP products. "Ultimately we believe that sap.com should be the front door for doing business with us. Right now it's quite hard for customers to find what they need because there are so many SAP branded websites to look in," said Tedesco. Social media played a role in lessening this complexity and reaching customers earlier in the decision process, but its use at SAP was still in its nascent stage. "We need to get to a place where we understand the role social media plays in the customer decision journey and the attribution model, so that we can develop guidelines and

requirements for internal use. We are using it, and it's great, but there are still a lot of unknowns," explained Fox.

To further support the company transition, SAP leadership leveraged itsUniversity Alliances program to educate undergraduate and graduate students at 1,470 global universities about the company and SAP HANA, but also to attract young talent into the organization. "We need another mindset and skillset to support this. We are now attempting to recruit the younger generation more than we did historically. We believe they will know how to create the applications that drive the next technology," said Ann Rosenberg, University Alliance lead. "We need to have an ecosystem and mindset of innovation at the company—which we believe will come from the younger generation—to drive innovation in our technology for our customers," she added. Rosenberg and SAP leadership set a goal of hiring 1,500 university graduates in 2014 (the company had 64,422 total employees in 2012).

Communities of Innovation

Historically, the members participating in communities of innovation were professionals, but the company's shift to the cloud helped expand community membership. "Communities are profoundly flexible. They are what people need from them. We provide the bucket and members can put whatever they want into it. The communities can help smooth out the complexity of SAP," explained Fox. McDermott and the rest of his leadership team understood the immense role communities played to smooth the complexity of SAP's offering and the company's cloud transition.

Partner Models

SAP partnered with hardware suppliers, software suppliers, system integrators, and third-party consultants. Partnerships were meant to provide SAP customers with a comprehensive selection of external competencies that complemented the customer's needs. Rosenberg and the University Alliance also began to set up innovation platforms with universities to jointly conduct innovations. "We give the university the platform of the innovation technology, and then the university and the student become the hub for SAP customers. We use these partnerships to drive change and innovation, but also to complement our efforts to attract the younger generation to SAP," she said.

SAP established partners in all areas of IT, regardless if they were competitors in other lines of business.

Existing Hardware Strategy for Datacenters

SAP used certified hardware partners (e.g. IBM, HP, Dell, Cisco, Hitachi, Fujitsu, and Lenovo) for SAP HANA on-premise installations. Installations included the hardware, operating system, and SAP software. Hardware partners had the ability to add specific best practices to optimize the performance of SAP HANA.

Moving forward into the cloud offerings, McDermott's team had devised a range of potential options. An SAP Cloud powered by SAP HANA had three primary options in which SAP provided all of the services and operations. SAP could then invest and own the data center and hardware; partner with a third-party data center while retaining ownership of the hardware; or enable a partner to act as an IaaS by owning the data center and hardware. Alternatively, partner clouds powered by SAP HANA took two general formats. The partner would operate and own the hardware and datacenter in each, but in one instance SAP would provide the services, and in the other, the partner would control the cloud from end-to-end. SAP had identified 33 services providers that could provide an end-to-end cloud powered by SAP HANA. "A partner can build a cloud infrastructure

powered by SAP HANA, and then sell its data center use on a subscription model under its own name. Alternatively, we can leverage the partner's cloud infrastructure and capacity, and sell that to our customers under SAP's name," explained Steven Birdsall, COO and senior vice president, global ecosystem & channels, and global head of OEM sales.

Reaching for the Cloud

As he walked off the stage in Walldorf, McDermott joined Alex Atzberger (HBS '05), his newly appointed Chief of Staff, on the way to their flight to Switzerland for the Davos summit. As they walked next door to get some coffee, the two began to discuss some of the challenges facing SAP.

With the transition into a cloud-based company fully underway, one of the major decisions on McDermott's mind was whether SAP should build and own its own datacenters or partner with a third party. Building could be an expensive proposition. (See **Exhibit 11** for 2012 capital expenditures by major technology companies.) Amazon, the leader in cloud-based IaaS, would spend over $5 billion in computing hardware and datacenters this coming year. Partnering to access hardware services seemed a natural option, and would avoid the need to make massive investments and build new capabilities. But many felt that SAP was large enough to at least offer its own datacenters as an option to its customers. How could SAP guarantee the quality and service its customers expected when it depended on others to deliver its service? Could SAP trust Amazon or IBM to deliver functionality to SAP's customers? Should SAP at least buy the hardware (and optimize it for the SAP HANA architecture), even if it was located in a third-party datacenter and operated by a partner? Could SAP rely on a third party for pricing the infrastructure services to its own customers? Would SAP still be able to control and capture the margins it needed? How could McDermott undertake the transition to the cloud without losing focus on the company's core business?

While McDermott weighed the pros and cons of SAP owning its own cloud infrastructure, he also had to address the announced departure of the head of cloud software, Robert Calderoni, after only eight months on the job. McDermott had to decide if he needed to name a successor, or if the cloud strategy had sufficiently permeated the company to the extent that no successor was necessary. These were major decisions for McDermott as Snabe's transition approached. The two men had jointly developed the company from an ERP market leader in 2010 to a much more powerful and relevant market leader in 5 market categories in 2014, but now the company's future success would fall squarely on McDermott's shoulders.

Exhibit 1 SAP Business Suite Core Software Application (2014)

The **SAP ERP** application supports critical business processes, such as finance and human capital management.

The **SAP Customer Relationship Management (SAP CRM)** application improves streamlined interaction with customers with integrated social media and mobile device support.

The **SAP Product Lifecycle Management (SAP PLM)** application manages the product and asset lifecycle across the extended supply chain, freeing the product innovation process from organizational constraints.

The **SAP Supplier Relationship Management (SAP SRM)** application supports key procurement activities.

The **SAP Supply Chain Management (SAP SCM)** application helps adapt company-specific supply chain processes to the rapidly changing competitive environment.

Source: "Helping the World Run Better," 2012 Annual Report, SAP, http://global.sap.com/corporate-en/investors/pdf/SAP-2012-Annual-Report.pdf, accessed January 2014, p. 60.

Exhibit 2 Consolidated Income Statements of SAP Group for the Years Ended December 31

€ millions, unless otherwise stated

	2012	2011	2010
Software	4,658	4,107	3,410
Cloud subscriptions and support	270	18	14
Software and cloud subscriptions	4,928	4,125	3,424
Support	8,237	7,194	6,370
Software and software-related service revenue	**13,165**	**11,319**	**9,794**
Consulting	2,442	2,341	2,197
Other services	616	573	473
Professional services and other service revenue	**3,058**	**2,914**	**2,670**
Total revenue	**16,223**	**14,233**	**12,464**
Cost of software and software-related services	-2,551	-2,107	-1,823
Cost of professional services and other services	-2,514	-2,248	-2,071
Total cost of revenue	**-5,065**	**-4,355**	**-3,894**
Gross profit	**11,158**	**9,878**	**8,570**
Research and development	-2,253	-1,939	-1,729
Sales and marketing	-3,907	-3,081	-2,645
General and administration	-947	-715	-636
Restructuring	-8	-4	3
TomorrowNow litigation	0	717	-981
Other operating income/expense, net	23	25	9
Total operating expenses	**-12,158**	**-9,352**	**-9,873**
Operating profit	**4,065**	**4,881**	**2,591**
Other non-operating income/expense, net	**-173**	**-75**	**-186**
Finance income	107	123	73
Finance costs TomorrowNow litigation	-1	8	-12
Other finance costs	-174	-169	-128
Finance costs	-175	-161	-140
Financial income, net	**-68**	**-38**	**-67**
Profit before tax	**3,824**	**4,768**	**2,338**
Income tax TomorrowNow litigation	0	-281	377
Other income tax expense	-1,000	-1,048	-902
Income tax expense	-1,000	-1,329	-525
Profit after tax	**2,823**	**3,439**	**1,813**
Profit attributable to non-controlling interests	0	1	2
Profit attributable to owners of parent	2,823	3,438	1,811
Basic earnings per share, in €	**2.37**	**2.89**	**1.52**
Diluted earnings per share, in €	**2.37**	**2.89**	**1.52**

Source: "Helping the World Run Better," 2012 Annual Report, SAP, http://global.sap.com/corporate-en/investors/pdf/SAP-2012-Annual-Report.pdf, accessed January 2014.

Exhibit 3 Cloud Computing Essential Characteristics as Defined by the National Institute of Standards (NIST)

On-demand self-service. A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.

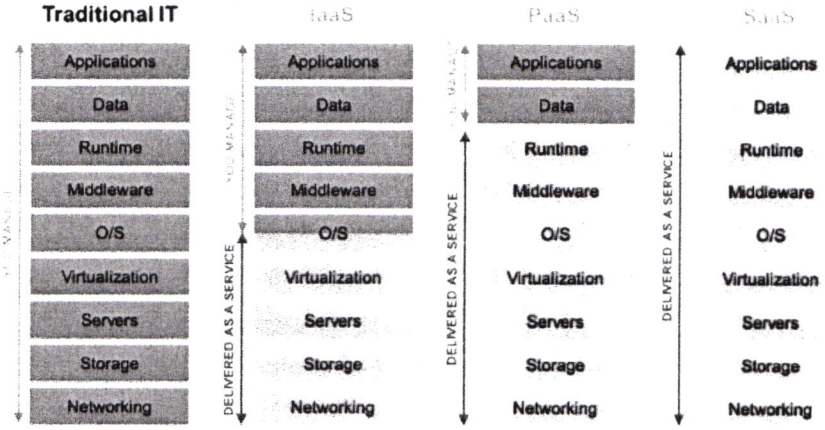
Rapid elasticity. Capabilities can be elastically provisioned and released, and in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Source: Taken verbatim from: Peter Mell and Timothy Grance, "The NIST Definition of Cloud Computing," National Institute of Standards and Technology, U.S. Department of Commerce, Special Publication 800-145, September 2011, http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf, accessed January 2014.

Note: The metering capability of cloud systems was typically done on a pay-per-use or charge-per-use basis.

Exhibit 4 Comparison of Traditional IT, Iaas, PaaS, and SaaS



Source: Rolf Harms and Michael Yamartino, "The Economics of the Cloud," Microsoft, November 2010, http://www.microsoft.com/en-us/news/presskits/cloud/docs/the-economics-of-the-cloud.pdf, accessed January 2014, p. 11.

Exhibit 5a Growth Dynamics of SaaS Market

Element	Explanation
Definition	Software-as-a-service (SaaS) pertains to standard software application functionality delivered over the public Internet and provided through a usage-based pricing model. The underlying application resources are shared among a large number of users. Forrester's cloud sizing model in this category focuses on business applications — such as CRM, SCM, and SFA. The cloud-based delivery of platform software and infrastructure software are reflected in the PaaS and IaaS categories, respectively.
Usage scenarios	Using business application functionality like HR and performance management, CRM, SCM, and business intelligence delivered via a public cloud infrastructure and without owning the software licence or hosting the application on-site.
Business value-add	SaaS turns software-related spending from capex into opex with typically much faster implementation times (reduced time-to-market) and a higher degree of flexibility (opt in and out).
Vendor/provider examples	Alteryx, Cisco Systems, Citrix Systems, Concorstorage, Emptoris, Google, IBM, Intuit, Ketera, Microsoft (Dynamics Online), NetSuite, Oracle, RightNow Technologies, salesforce.com (CRM), SAP, SuccessFactors, Taleo, and others.
Hypergrowth begins	Every SaaS application type (i.e., CRM, SCM, BI) has its own market adoption curve. For example, CRM, HCM, and eProcurement are already widely used in the market, with BI and PLM just entering hypergrowth and ERP and EAM lagging behind. Hypergrowth for the overall SaaS market started in 2008, but it will take a long time for all the different SaaS applications to reach saturation.
Takeover time	Some SaaS markets, like CRM, will reach high market penetration (the definition of takeover time) as early as 2013. However, because of the many different SaaS markets, it will be 10 years overall from the 2008 hypergrowth starting point until SaaS reveals its full potential.
Saturation	SaaS business applications will not take over 100% of the packaged business application market for various reasons. For example, companies will ultimately prefer hybrid models, with business-critical, competitive, and custom-built applications staying on-premises and the standardized, less business-critical applications moving into the cloud.
Market dynamic	Cannibalization of packaged business applications
Market size 2011 (US$ billions)	$21.21

Source: Stefan Ried and Holger Kisker, "Sizing the Cloud," Forrester Research, Inc. April 21, 2011, p. 7.

Exhibit 5b Growth Dynamics of PaaS Market

Element	Explanation
Definition	Platform-as-a-service (PaaS) represents a complete preintegrated platform offering for the development and operations of general purpose business applications.
Usage scenarios	Three major usage scenarios: 1) ISVs resell PaaS underneath newly built SaaS applications; 2) service providers leverage PaaS to host applications in virtual private cloud models; 3) enterprise users migrate custom application development into the cloud.
Business value-add	A fully preintegrated and standardized platform — offered in a multitenant mode as a managed service — means much less manual effort than installing and configuring middleware components.
Vendor/provider examples	Caspio, Cordys, Force.com, Google (App Engine), Heroku, LongJump, Microsoft (Windows Azure), OrangeScape Technologies, Tibco, WaveMaker Software, WorkExpress
Hypergrowth begins	Many ISVs have been using PaaS since 2010; usage in corporate application development will take off in 2011, while service providers will engage more with PaaS from 2012 on. Hypergowth will start, on average, in 2011.
Takeover time	While ISVs have a takeover time of three years, corporate application development will transition within five years and service providers will be even slower — seven years. The average takeover time in this simplified model is five years.
Saturation	We assume that 15% of all corporate application development will move to PaaS; 35% of all business applications can potentially move into SaaS (see SaaS table). Only a third of these (12%) will build their SaaS applications on an standard PaaS. Only 8% of all outsourcing service providers will embrace PaaS in their client engagements. The average of all three contributions is 12%.
Market dynamic	Cannibalization of traditional middleware segment, SaaS, application development services, and application management services
Market size 2011 (US$ billions)	$0.82

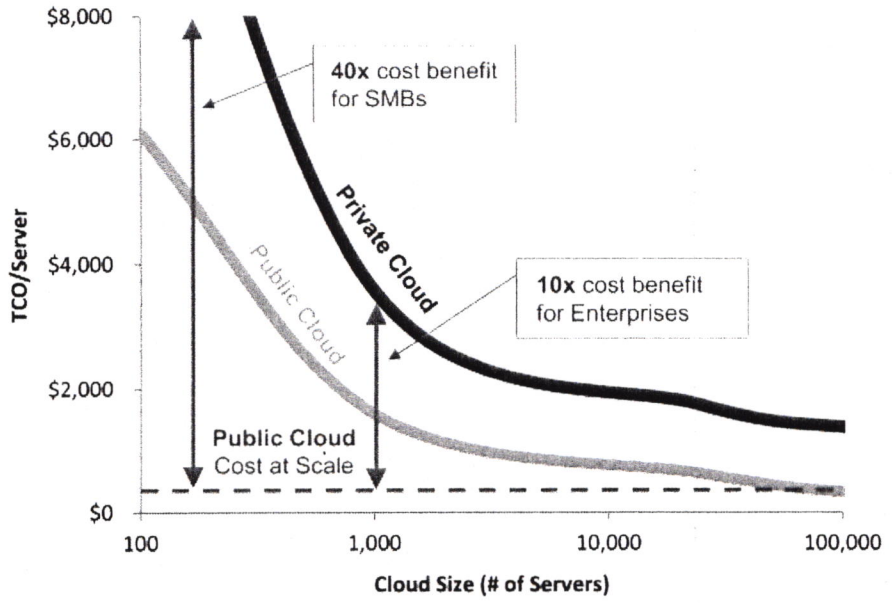
Source: Stefan Ried and Holger Kisker, "Sizing the Cloud," Forrester Research, Inc. April 21, 2011, p. 6.

Exhibit 5c Growth Dynamics of IaaS Market

Element	Explanation
Definition	Infrastructure-as-a-service (IaaS) is highly standardized selective computing functionality — such as compute power, storage, archive, or other basic infrastructure components — provided over the public Internet through a utility pricing and delivery scheme. The underlying computing resources are shared among a large number of users and hosted by the IaaS provider.
Usage scenarios	IaaS replaces or complements on-premises physical hardware. Customers typically use IaaS for workloads that are less critical in terms of business criticality or legal compliance. In addition, ISVs use IaaS to host traditionally developed SaaS business applications.
Business value-add	IaaS shifts the infrastructure spending for many IT workloads from capex to opex. Due to the higher levels of utilization and a highly standardized infrastructure management process, IaaS represents an industrialized offering that provides computing resources on an as-needed basis at a very low price.
Vendor/provider examples	Amazon EC2, Google App Engine, Microsoft Windows Azure (this also falls into PaaS category with its higher-value components).
Hypergrowth begins	Ten percent of the maximal adoption was passed at the beginning of 2010 with the growing popularity of Amazon's EC2 and rapidly rising revenues.
Takeover time	Further IaaS growth is delayed by the high average turnaround time of traditionally purchased servers. Many servers will be replaced by IaaS after two years.
Saturation	Forrester assumes that about 15% of enterprise workload capacity can potentially shift to IaaS. Other servers will remain either as capex investments in enterprise budgets or will shift into other cloud segments, such as dynamic infrastructure services.
Market dynamic	Cannibalization of physical infrastructure components (hardware and software), IT outsourcing, SaaS.
Market size 2011 (US$ billions)	$2.94

Source: Stefan Ried and Holger Kisker, "Sizing the Cloud," Forrester Research, Inc. April 21, 2011, p. 5.

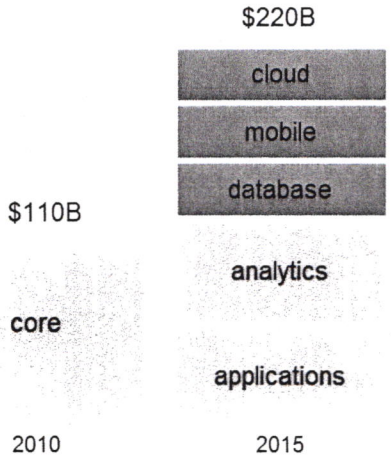
Exhibit 6 Cost Benefit of Public Cloud



Source: Rolf Harms and Michael Yamartino, "The Economics of the Cloud," Microsoft, November 2010, http://www.microsoft.com/en-us/news/presskits/cloud/docs/the-economics-of-the-cloud.pdf, accessed January 2014, p. 15.

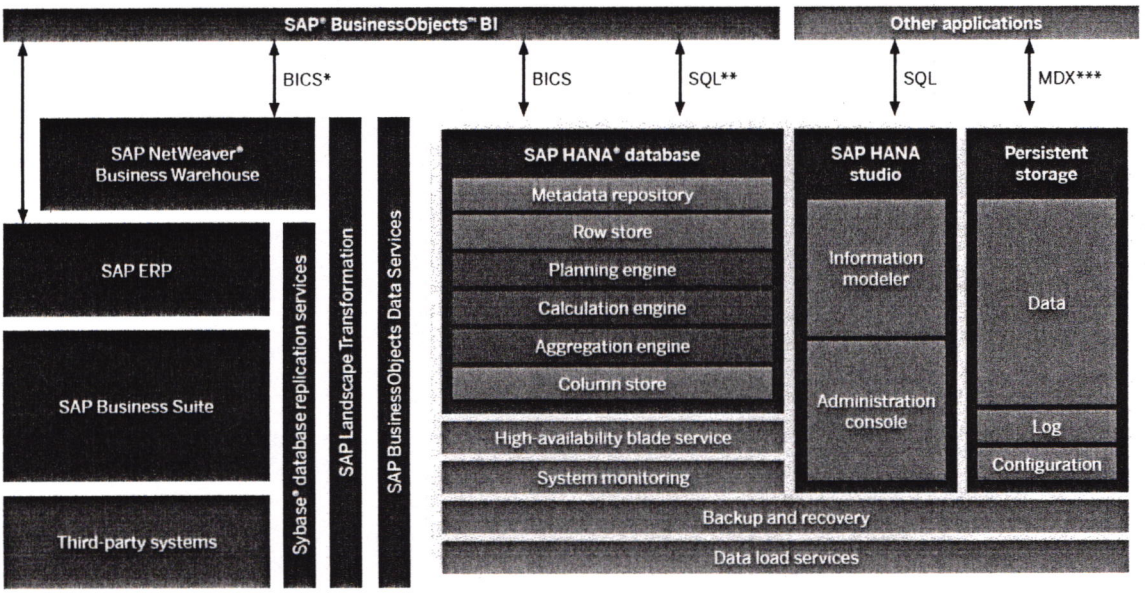
Note: SMB - Small and Medium Businesses; TCO - Total Cost of Ownership

Exhibit 7 2010 Strategy



Source: Company document.

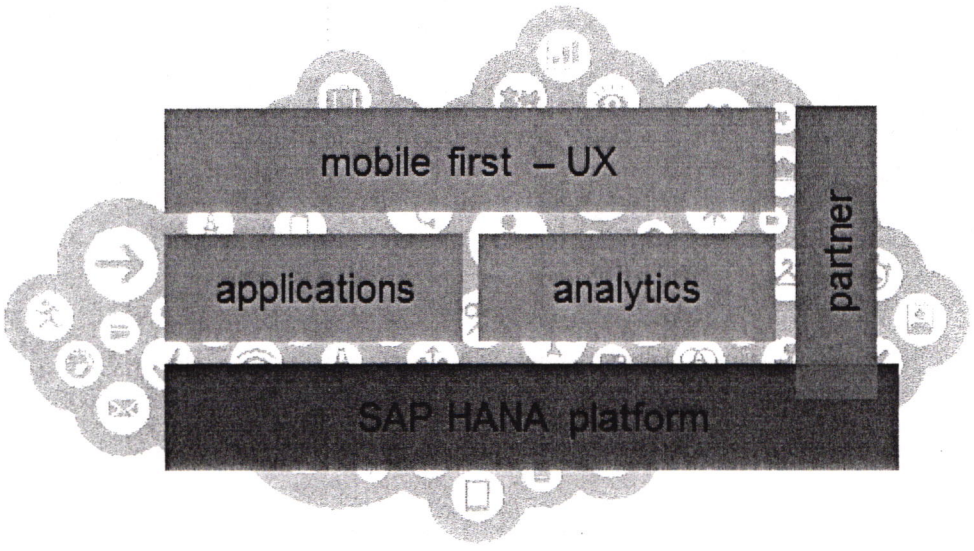
Exhibit 8a SAP Platform Overview



*BICS = business intelligence consumer services, **SQL = structured query language, ***MDX = multidimensional expression

Source: Company document.

Exhibit 8b SAP HANA platform intersection with SAP products



Source: Company document.

Exhibit 9 SAP Products Powered by SAP HANA

Applications

SAP Business Suite

Analytics

SAP BusinessObjects business intelligence (BI) solutions

SAP solutions for enterprise performance management (EPM)

SAP solutions for governance, risk, and compliance (GRC)

Applied analytics solutions

Edge solutions for small and midsize enterprises

SAP Crystal solutions

Mobile

SAP Mobile Platform (includes Sybase Unwired Platform)

SAP Afaria

Sybase 365

Cloud(delivered as SaaS)

SuccessFactors Business Execution (BizX) Suite

SAP Financials OnDemand and **SAP Travel OnDemand**

SAP Business ByDesign and **SAP Business One OnDemand**

Suites of application and solutions for customer interactions and supplier processes

Database and Technology

SAP HANA

SAP NetWeaver

SAP NetWeaver Business Warehouse

SAP Sybase IQ

SAP Sybase Event Stream Processor (SAP Sybase ESP)

SAP Sybase Adaptive Server Enterprise (SAP Sybase ASE)

Source: "Helping the World Run Better," 2012 Annual Report, SAP, http://global.sap.com/corporate-en/investors/pdf/SAP-2012-Annual-Report.pdf, accessed January 2014, p. 60-62.

Exhibit 10 National Basketball Association (NBA) Player Statistics Web Portal

Source: NBA Stats, "Home," http://stats.nba.com/, accessed January 2014.

Exhibit 11 Capital Expenditures (2012)

Verizon	$20.11 billion
AT&T	$19.73 billion
Apple	$9.08 billion
IBM	$4.72 billion
Microsoft	$4.26 billion
Amazon	$3.79 billion
Google	$3.27 billion
Hewlett-Packard	$3.20 billion
Facebook	$1.24 billion
Rackspace	$270.37 million
VMware	$234.46 million
Salesforce.com	$179.71 million

Source: The Wall Street Journal, "Market Watch," http://www.marketwatch.com/, accessed January 2014.

Note: Expenditures are for the entire company and not necessarily just cloud or IT infrastructure.

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[5]Marco Iansiti and Karim R. Lakhani, "SAP AG: Orchestrating the Ecosystem."

[6]Marco Iansiti and Karim R. Lakhani, "SAP AG: Orchestrating the Ecosystem."

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