SAP *IT Briefing:*

SAP System Consolidation, Benefits and Lessons Learned

By Volker Joehnk, Platform IT Manager, HP, IT Americas
and Ken Gazarek, HP Consulting and Integration

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Volker Joehnk is Platform IT Manager for Hewlett Packard Company has over 17 years of SAP experience in the areas of order management, supply chain and finance. He's held various IT positions supporting SAP applications from an operational perspective. His current position involves managing day-to-day operations for HP's largest order fulfillment SAP platform, R/3, APO and BW supporting U.S. resellers and retailers. Before joining HP, Volker was an SAP FICO consultant with PricewaterhouseCoopers and held positions as Class Controller with T-Mobile and Heidelberg Cement.

Ken Gazarek has seven years of SAP infrastructure consulting experience with HP Consulting and Integration. He's worked as an SAP infrastructure architect and Basis consultant. Ken has held numerous positions in SAP infrastructure design, implementation, migration and consolidation. Prior to joining HP, Ken spent 10 years working in both IT and engineering roles in the oil and telecommunications industries.

JOEHNK: Hello everyone. This is Volker Joehnk and I'm with HP in Palo Alto. As Dottie mentioned, I'm an IT Platform Manager supporting an SAP order-management/order-fulfillment platform, which consists of R/3, APO and BW. The purpose of the presentation I'm about to share with you is to provide you with feedback on some consolidation projects we went through and the lessons learned. And as you can see from the agenda, which I'm about to share with you in the next few seconds here, I would like to give a kind of overview of what kind of IT organization we are and then continue to share a little bit about the drivers we had for consolidating R/3 instances, and I'm really focused only on R/3. I'm not talking about BW and APO consolidations. I will move on to explaining a little bit about types of R/3 consolidation and point you to the areas where we have done some consolidations, and then I will very specifically talk about two SAP consolidations we went through. Then I will wrap up the presentation with some conclusions and some lessons learned.
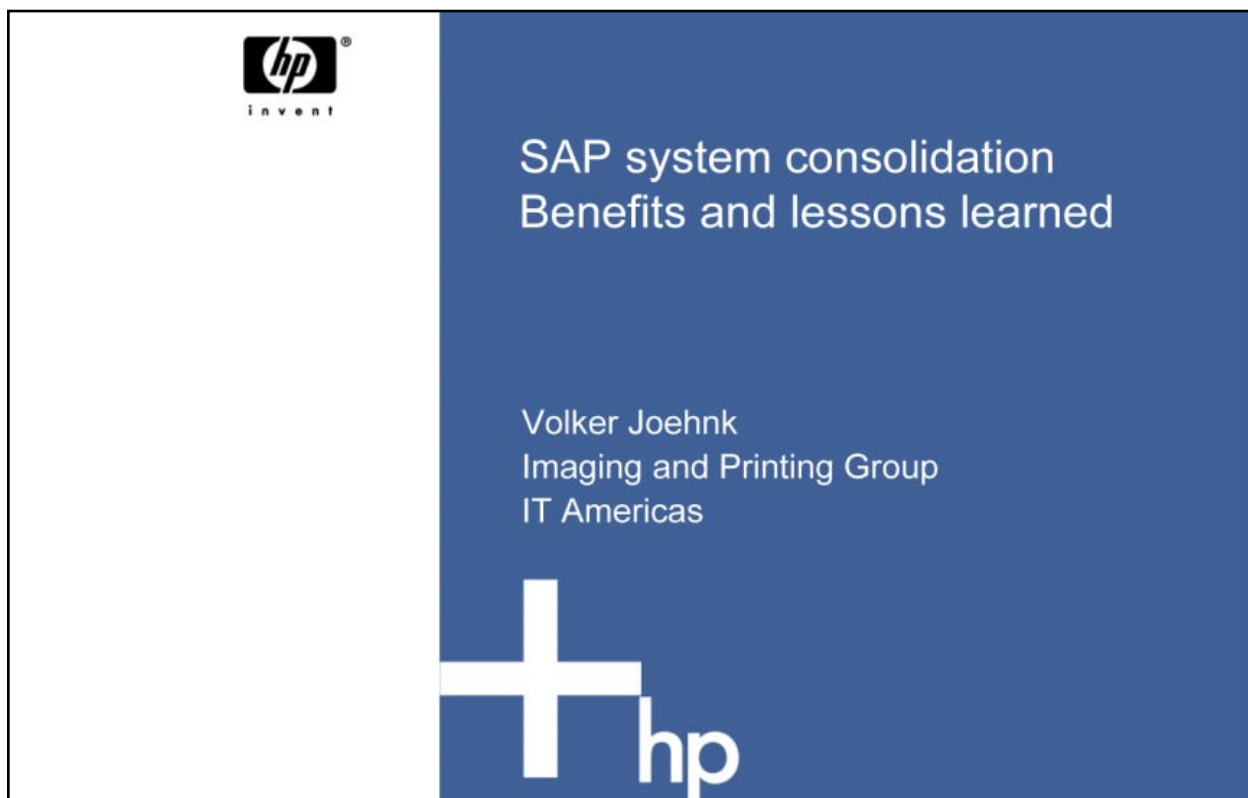

Figure 1

Let me move on with the next slide, which talks about our organization. We are an IT support organization and we report to the Imaging and Printing Group, and as you may know, HP has four global business units. I'm with the global business unit IPG, or Imaging and Printing. The next speaker, Ken, is with HP Services, and then we have ESG, which is Enterprise Systems Group and PSG, which is the Personnel Systems Group. We support two SAP-based order management and order fulfillment platforms for the Americas, and the platform, as I mentioned earlier, consists of two R/3 instances and one BW and one APO instance. And the APO and BW instance is shared among the two R/3 instances. And we do support the replenishment business for consumer and commercial customer accounts.

The way we are organized is simply by service domains. And we do have a co-sourced application management service model in place for this venture. The organization is based on a three-tier model, which means we have help desks, partner care, and sustaining engineering —so we are not a development organization. We do have respective development organizations working on this platform. We, from an operational point of view, are focused on keeping the plane flying and taking care of small stuff. Small stuff, for instance, is in effect, enhancement and system maintenance. And when it comes to system maintenance, I'm talking about software release levels and service packs and upgrades. And as a side note for those of you who are interested, and I apologize if I'm getting too detailed in advance here, we run R/3 on a 4.6c instance release with service pack 4.0. BW we currently run it on 3.0B and I believe it is service pack 10 and we run APO on 3.0A service pack 21 or 22.

In terms of location, I'm here at the Palo Alto site in California. We have two other sites where we basically manage the day-to-day operations for the region here, and the region is the Americas. The other locations we have are Toronto in Canada, basically with Accenture—who is our application management service provider—and we do have another location in Guadalajara in Mexico, where we basically run the Canada and Latin America operations.

Let me pause for a second and move on to the next slide. The next slide is talking about some specific drivers for the consolidation project we went through and some of them I would say are well known and I think you can find them almost anywhere. When it comes to business, the business

SAP consolidation case studies Agenda

- Who are we ?

- Drivers for consolidations
- Types of SAP R/3 consolidations
- Case studies
  – SAP R/3 retirement project
  – SAP R/3 consolidation project

- Conclusions

Figure 2

perspective is always to lower the operational costs. What I mean by that is basically in the order management and order fulfillment business, we are expecting to lower the cost-per-order dollars, and this is a kind of guideline we have now going on for many years. The other aspect—and this may even have something to do with the merger HP and Compaq went through—is to respond in line with organizational changes. What it means is in essence to align the supporting IT systems with the organizational structure.

From an IT perspective, where we are focused heavily is, interestingly enough, on improving the service levels. We were constantly demanded by the business to increase the uptime, so we have uptime service levels of 98%. Interestingly enough, it was not good enough for the business, which is understandable, especially in the order management and order fulfillment business. So, one of the requests we followed up was to increase the system uptime to 99.5% and now we are in a higher availability environment.

The other aspect in terms of improving service levels was to look at failover and DRP capabilities, and I apologize for using these acronyms. DRP stands for Disaster Recovery Plan. This is typically used or involved to some degree as we faced some serious hardware issues so that we can failover to backup systems within the data center. Also, we added capabilities so the data center we have has the capability of a dual site DRP where we can failover to another site in case the entire site goes down.

From an IT operational cost structure with the consolidation project we went through, we are now in a position to leverage the IT stuff much better.

Who are we ?

- Imaging and Printing Group (IPG) IT Americas supply chain operations supports two SAP based order management and order fulfillment platforms for the Americas. The SAP platforms represent the replenishment business for commercial and consumer customer accounts.

- Supply chain operations is organized by service domains with a co-sourced application management service. This organization is based on a 3-tier support model.

- We have 3 locations
  – Palo Alto, California – U.S. replenishment operations
  – Toronto, Canada – Accenture AMS
  – Guadalajara, Mexico – Canada and Latin America operations

Figure 3

When I talk about IT stuff, it means our local stuff we have, which is mainly focused on application support. I'm coming back to the tier-one, tier-two and tier-three model, and of course, the IT stuff in the data centers supporting the applications and instances. And last, but not least, I think a very important point to us is always sharing the existing environment infrastructure. This is one of our key points we took away when we went through the consolidation project.

Let's move on. I'm pointing to the next slide, which gives you a kind of simplified illustration of the types of consolidations. The reason why I want to spend a couple minutes on it is to give you a kind of idea what kind of consolidation techniques we have. I know that Ken, later on in his presentation, will be more specific in some areas.

Let me start bottom-up. One of the aspects we took into consideration was data center migration where we basically looked around and said, "Okay, what HP data center cannot provide us the service levels we need and the operational cost structure we need in order to support the business accordingly?" The other aspect is to look at the hardware level, and I simplify things by saying hardware level. My definition of hardware level is almost everything, so it is basically the instance, the environment, and everything that is somehow related to hardware. The next aspect of consolidation, if you go up the stack here, is really to think about consolidation from client or application levels, and this would be to utilize the concept of having multiple clients within SAP. This means you have logical instances and one physical instance when it comes to the database, and you move your SAP application or move our SAP application to a specific dedicated client.

The next level would be to consolidate within a client. As a matter of fact, this is quite a challenge and I can talk about this later. One simplified case of a single SAP client would be transaction processing, migration to one SAP client and this is a pretty common thing we have utilized. I've seen this in other areas where you basically look at SAP instances, and you move business from one SAP instance to another instance. As a matter of fact, you can do this as a business model allows if the supporting structure is in place.

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Let me move on with the next slide. This shares a little bit of the experience we have made with one type of consolidation. I think I can share it right now. This is referring to my earlier statement about moving transaction processing from one instance to another instance. We faced some situations about three years ago that we had two SAP applications for order management and order fulfillment up and running for the direct and indirect business. We call it direct or indirect business; it's mainly replenishment business. We realized that it is pretty costly to operate and run two SAP applications in parallel, so the decision was made to retire one of the smaller SAP applications and to move the business we had in this particular instance to a bigger SAP order management and order fulfillment instance. So in terms of benefits, we were quite impressed by the savings and as you can see, we realized annual savings of about $1.4 million. The majority of these savings are the result of some reduction of test and development systems and production support.

So, what it means is if you have these production systems up and running, you need to provide test and development systems. Plus, there is development, and yes, there are test and integration activities going on. So, with taking away the hardware, we realized these kinds of savings right away, and we moved the business to the bigger instance. For us it was more or less a sizing-up exercise in order to make sure that we could process the additional business.

As I mentioned earlier, there were very specific situations where you can do those kinds of things. In this particular case, given the fact that these instances are pretty similar, we only had to add direct capabilities, mainly via consolidation, in order to migrate the business and subsequently trade the customers from one SAP instance to the other SAP instance. In order to be very specific, we stayed within the company code, so it was a kind of simplified consolidation we had at this point. But again, the savings we realized came mainly from the hardware.

Looking at the benefits… Let me explain the slide and clarify the purpose of it. The slide shows you the IT operation at a glance—basically, hardware support and application support. When I talk about hardware support, I'm looking at data center operations and application support. This is mainly done by us, and mentioned earlier, using the three-

Figure 4

tier model we have in place. You can see the first line of support is the help desk, the second is partner care and the third line of support is sustaining engineering. So, going back to this consolidation project, we have realized savings mainly in the hardware area. You can see we lowered the operational costs significantly, and this was more or less focused on the hardware and data center operations.

We also reduced the dedicated help desk we had in place for this particular instance and migrated the help desk activities to our main help desk. We were able to reduce the headcount in order to realize additional savings. When it comes to partner care and sustaining engineering, in these areas we haven't touched anything. So we have, on purpose, not realized any savings. As a matter of fact, we transitioned the headcount from the smaller instance to the bigger instance when it comes to partner care and sustaining engineering.

The second example I would like to share with you, and I can spend a couple of minutes on this, is the data center migration and hardware consolidations. As I pointed it out earlier, it's always been a very interesting aspect when you look at your instance

like we did and at the data enter, to look at the capabilities a data center can offer. I was referring to high availability as we looked around within HP, and we identified the data center, which basically addressed our needs in terms of availability.

Secondly, we also looked at operational costs, and we found the data center was a very competitive operational cost structure. So in essence, when we started this project and successfully completed it, our operational cost structure got even lower although we increased the service levels. This was, for us, the underlying theme, because going back to the business and asking for more dollars is always difficult, especially in these times. Somehow we resolved the issue by identifying a data center and increasing the service levels and lowering the operational costs.

As a side note, we also realized savings, because we ran our entire platform on an HP 9000 machine. With moving to this data center, we were able to take advantage of the Superdome architecture. The architecture is a very compelling architecture because of two reasons. You can basically stick everything into a couple of Superdomes, and you run multiple instances like BW and APO and R/3 in

Types of SAP R/3 system consolidation
Simplified illustration

Degree of consolidation	Impacted area		
		System Perspective	Process perspective
Transaction processing migration to one SAP client		Scalable hardware required to handle additional volume.	SAP configuration / process capabilities need to be enabled.
Single SAP client		SAP application consolidated within a SAP client.	One support staff in place from an application, basis and db support.
Multiple SAP clients		Multiple SAP clients share application and db hardware.	One IT basis and database support staff in place. Continue to have dedicated staff for SAP application support.
Hardware level		Physical sharing of hardware and infrastructure within a data center.	Data center IT operations staff better leveraged between logical SAP instances.
Data center		Application & systems (hardware) migrated to one single data center.	Service partner consolidation – one service level agreement in place.

Figure 5

one Superdome. You share the disk storage, so there are some very compelling reasons to utilize the Superdome architecture. Furthermore, you can save a lot of floor space. So, if I look back at the HP 9000 architecture, I had used up a lot of floor space, and with the Superdome architecture you can basically gain a lot of floor space. This is an important point when it comes to high availability data center, because I don't want to go ahead and flood the data centers with servers in the subject location.

Coming back to the data center migration and hardware consolidations, the situation I'm referring to is, again, that we support two SAP applications; R/3 applications for the order management and order fulfillment space. These two applications are located at two different data centers and supported by two different IT operations staff when it comes to the data center. So, we went ahead and launched the project about six months ago, where we simply started the consolidation project of moving the applications and the entire instance, we have three instances, from one data center to the other data center. In addition to that, we took advantage of the Superdome technology we had in place and added capacity to the existing Superdomes in order to leverage the hardware much better.

So in essence, if you look at the benefits, you can see two key highlights. First of all, the service levels have improved. The system uptime went up by 0.5%. We are right now on 99.5%. We have added the failover and DRP capabilities, and we are in a position right now of sharing the infrastructure and environment much better. We couldn't do it before because we were basically located in two different data centers. Even on top of this, we were able to lower the operational costs. As you can see from the last statement, we realized an ROI in less than seven and a half months. What it means is that for us, it was a very successful project because these ROIs, if you can do it in less than one year, it's excellent. As you can see even from the cost reductions, we realized savings about 35% with the combination of moving into a data center, increasing the service levels, and sharing, consolidating and leveraging existing hardware we had in place.

Moving on to the next slide… Let me show the grid a little bit. Again, as I pointed out, we have significantly improved the service levels. Let me stress again, especially when you are in the order management/order fulfillment business, availability is everything. Even if we face hardware issues, we are in a position now with the failover capabilities

Figure 6

Transaction processing migration to one SAP client
Benefits at a glance

Benefits at a glance	IT Operations			
	Hardware support	Application support		
	Data center operations	Helpdesk (1st line support)	Partner care (2nd line support)	Sustaining engineering (3rd line/deep support)
Service levels	N/A	Helpdesk consolidated	N/A	N/A
Operational cost	Hardware reduced	Headcount reduced	N/A	N/A

Figure 7

Types of SAP R/3 consolidation
Data center migration and hardware consolidation

- Transaction processing migration to one SAP client
- Single SAP client
- Multiple SAP clients
- Hardware level
- Data center

Situation:

2 SAP applications for order management and fulfillment replenishment business of the   Americas are located at 2 different data centers   although supported by the same IT operations staff.

Objective:

Consolidate SAP OM instances to one data center by migrating one SAP instance to a high availability data center.

Benefits:

Overall service levels have improved (e.g. system uptime went up 0.5%, dual site DRP capabilities added. Hardware infrastructure and environment is shared between the SAP instances).

Ongoing operation cost have been reduced by 35%. The ROI for this investment has been achieved after 7.5 months.

Figure 8

that we have to failover to standby servers without interrupting the business. I think this is the most important benefit and, from my perspective with managing the day-to-day operations, if you have hardware issues like we had in the past, we can simply failover and we can continue the operations without any business impact.

The other big saving we have realized, and this is coming back to the statements I made earlier, is we have reduced the hardware demands significantly by utilizing the existing hardware we have in the data center. This is, again, a Superdome-based hardware and architecture we have utilized. We have taken advantage of the operational cost structure in this data center, which was more in our favor than the cost structure in the other data centers we have experienced.

Coming to the conclusion, of these consolidation projects we went through, brings me to the last slide. Again, one of the key drivers for SAP consolidation—and this is very specific to the business we are in—is lowering the operational costs by increasing the service levels. As I stated earlier, we were very successful in doing this, although it is hard work, there is no doubt about this and there's

no easy going in terms of achieving these goals. We spent a lot of time in standardizing and simplifying the services among the order management and fulfillment instances, and this is mainly to improve the productivity and efficiency we have in this area.

The second finding, or conclusion, we took away from these consolidation projects is the data center locations and the hardware locations—and I think I stressed the points multiple times—the location of the data center is very important to us for two reasons. These are labor costs plus capabilities the data center has to offer. Especially in our business, where we have to provide high availability to the business, we found the data centers within HP— which had the high availability capabilities, failover capabilities, plus dual site disaster recovery plan— useful. On top of that, we were able to utilize the hardware much better. Looking at the hardware itself, you can utilize the application and database service up to 50 – 60%, which is a pretty good number for us. If you're interested in response time, at one point we were able to achieve response times on the R/3 system of less than 200 milliseconds, which is pretty good and almost far too good for these kind of instances.

Data center migration and hardware consolidation
Benefits at a glance

Benefits at a glance	IT Operations			
	Hardware support	Application support		
	Data center operations	Helpdesk (1st line support)	Partner care (2nd line support)	Sustaining engineering (3rd line/deep support)
Service levels	Significantly improved	N/A	N/A	N/A
Operational cost	Hardware reduced and better leveraged	N/A	N/A	N/A

Figure 9

Conclusions

- Our key drivers for SAP consolidations were lowering of operational cost by increasing service levels and standardizing (simplifying) services among SAP order management and fulfillment instances.

- The biggest cost saving opportunities we have seen is the location of the data center and the hardware consolidation as result of sharing infrastructure and environment.

- In order to minimize the risk of project failures we have broken the overall consolidation program into smaller pieces with a fixed scope and timeline.

- The next consolidation phase will be focused on the SAP client level.

Figure 10

Then the other take-away from these consolidation projects is we typically break these projects into small pieces with a fixed scope and timeline. Given the fact that these projects are risky, especially when you move things around, we felt that breaking these projects into smaller pieces gave us the opportunity to be successful. We typically do not allow any changes to the scope and to the timeline because, especially in the business we are in, once we get agreement from the business to a migration schedule and to a fixed schedule, we need to stick to it and we cannot push it out. So, one of the key drivers for us is to break these projects and programs into small pieces.

This is not the end of the story. As a matter of fact, we will continue to go into the next consolidation phases with our respective development teams. Those consolidation phases will be more focused on the client level where we then go ahead and say, "Okay, let's think about multiple R/3 lines, company codes running on one instance, on one physical instance," and these are things we are now approaching and one or two of the investigations we have underway. Hopefully in the next three or four months, we will be in a good position to share the

plan and how we want to move on with the client consolidation.

That's the presentation I have in terms of our experience with the consolidation projects, and I would like to turn it over to Ken.

GAZAREK: Thanks, Volker.

I'm Ken Gazarek, and I'm with HP Services, Consulting and Integration. My role in the last seven years has been to work directly with customers implementing SAP infrastructures, migrating SAP from one platform to another or doing consolidations where we were doing full technology refreshes, consolidating instances or just streamlining and optimizing the SAP infrastructure environment.

Today I'd like to give you an overview of various consolidation topics. Consolidation is such a topic that it would take hours to discuss the many, many points involved, but I'm going to try to survey all the different points so that we can have a good overview of everything involved in an SAP system consolidation.

To start with, I want to talk about the SAP consolidation roadmap and what a typical journey would look like for a company as they would move from how they were implemented five to six years ago when they first deployed various applications to a highly optimized, almost utility model where things are set up like the phone company. There are various stopping points and paths along the path, and this is just a model for a journey. For every company, this journey is very different. Most of the time, it's not a big bang approach because obviously, there are tons of risks and investment involved here, but in general this is the path that companies would take.

Starting out where systems are physically and logically distributed, when you first did your implementation, your division had a budget, they had a project; you implemented a product and starting running with that. Then another division did the same thing, and so on and so on. You wound up with all these disparate systems within the company.

The first step to consolidating SAP and optimizing infrastructure is the co-location phase. Really, the focus here is to try to take all of these disparate systems and try to at least put them in the same location: a single, secure, managed data center. Try to implement management systems, like OpenView for instance, that gives you visibility into each of these systems: what's going on, which ones are down, which ones are up, which ones are performing well and which ones are performing poorly. That's really the first step in helping to get a handle on and manage all of these systems.
The second step is more of what we frequently think of when we think consolidation. That's consolidating hardware and integrating various systems together. What we're looking at here is implementing things like storage area networks and looking at putting partitioning in systems where we can put multiple applications together on a single box and reduce the amount of maintenance involved with the SAP systems.

The next box down the line, the application integration place, is a place where very few companies have gone. It requires a significant investment and involves the actual consolidation of the applications themselves. Where you see this most frequently is when two companies merge together like with the recent merger of Compaq and HP. We're merging our HR systems and payroll and really couldn't operate with two completely separate
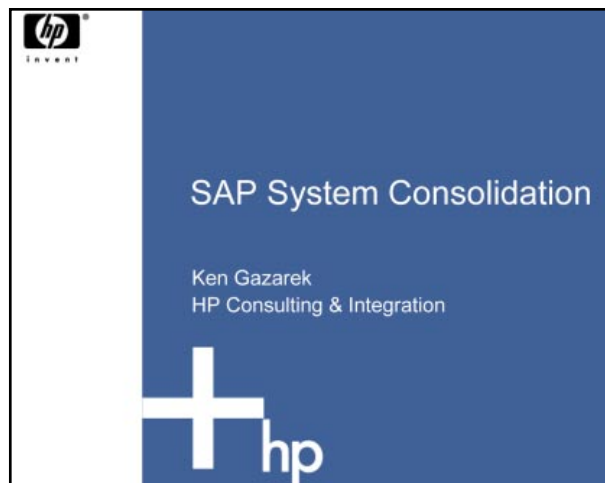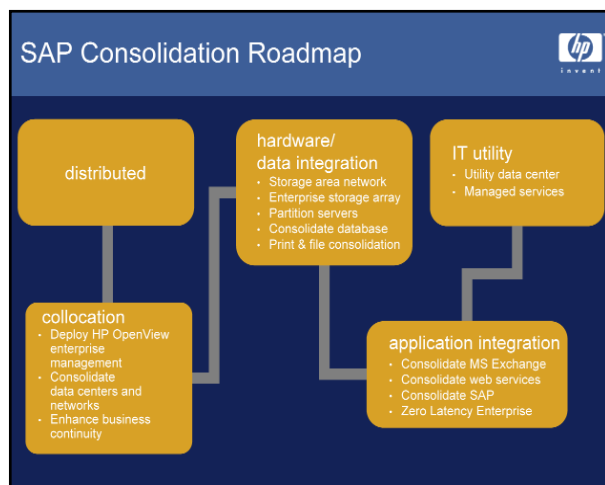

Figure 11

Figure 12

sets of systems, so we had to make the investment, do the business process re-engineering and get everybody onto a single set of application systems. But, this is very time-consuming and requires a significant investment.

The final step in the journey is kind of a vision to treat IT almost like utilities—like the power company or the telephone company, where you've got a highly standardized set of servers. Think of maybe Blade servers, et cetera, and then some software that, when you have a new application, you can carve out x amount of horsepower, x amount of storage. The software then automatically carves up your resources for you and makes them available to your end users for their applications. That's a pretty long path from the most disparate systems to running like the utility data center. We've got some tools and techniques that can get you to that process along the way.

SAP Consolidation Techniques

1. Application Consolidation
2. SAP Server Consolidation
3. SAP System Consolidation
4. SAP Instance Consolidation
5. SAP Storage Consolidation
6. Consolidation & Partitioning
7. Consolidation & Availability

Figure 13

The next thing I'm going to talk about here is the various SAP consolidation techniques, and we can talk about the different ways that you can consolidate SAP.

To start with, there's a term called application consolidation. This is what a lot of companies have done over about the past eight years or so where they've taken a lot of... I think the whole year 2000 was probably the starting point of this with companies trying to get away from all their homegrown systems that had huge investments in custom code. They were becoming very un-maintainable and had this issue that all this had to be year 2000-compliant. A lot of companies decided at that point in time to look for a standard software offering such as SAP and consolidate on a number of applications that they ran in their environment, and tried to get off their custom applications as much as possible. This is what a number of companies have done already: moving from their custom apps or a number of apps from different vendors and standardizing on a single, consolidated application like SAP.

The second point down the line is SAP server consolidation. That's going to involve consolidating application servers and lower horse-powered boxes with some of the more recent technology—faster servers with much more bandwidth, much more CPU processing power—and reducing the overall server count in the environment. Still, the servers remain in their own environments, but take advantage of some of the new, latest stuff available on the market.

The third item down the line, SAP system consolidation has to do with taking multiple SAP systems and running them on single servers and consolidating. There are a couple of ways to do that. One technique is called Application Stacking, where you would run multiple SAP systems within a single operating system instance. Things like development or standby systems are typically done this way, when you can afford to have many different SAP applications running on a single operating system, and it's without the worry in a firm's liability and stability, as you would in a production environment. Also, SAP for smaller companies has the capability of running multiple components in a single database, in what they call MCOD where you can have R/3 and BW and CRM all running on a single

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Oracle database. We try to reduce the amount of administration costs and hardware costs involved in that environment.

The next item, number four down the line, SAP instance consolidation is very similar to what I described before when we had the two companies come together and we had to merge the actual SAP systems themselves. So, when Compaq was running their client and HP was running their client, we had to merge those two clients together so everybody would be running on a single instance. That required a significant amount of business process re-engineering and application development.

The fifth item down the line, SAP storage consolidation, which I'll get to in some of my further slides, is basically talking about taking all of the dedicated storage for each application that we mentioned in the past, maybe it was SCSI attached, maybe it was what we used to call JBOD (just a bunch of disks), directly inside the server itself and consolidating them into a storage area network and shared storage pool that could be used much more efficiently and could improve the performance of the systems.

Number six is consolidation and partitioning. This is one of the biggest opportunities these days to consolidate multiple applications within a single operating system instance or multiple operating systems instances on a single box and see some efficiencies there from an operations cost, licensing cost, et cetera.

Then finally, number seven is consolidation and availability. Before, we might have either no high availability solution or dedicated high availability solutions where you'd have a dedicated failover server for each production box to maybe one to many failover scenarios. We could have many production boxes potentially failing over to a single failover box, or you might have an SAP production database failing over to a production application server. Now, maybe you look at failing it over to a quality assurance server or something, so you're not taking out production capacity when you have a failover.

The next slide has to do with HP's consolidation methodology. As it mentions our approach at looking at one of these consolidations, we're trying to make the IT environment more efficient within a
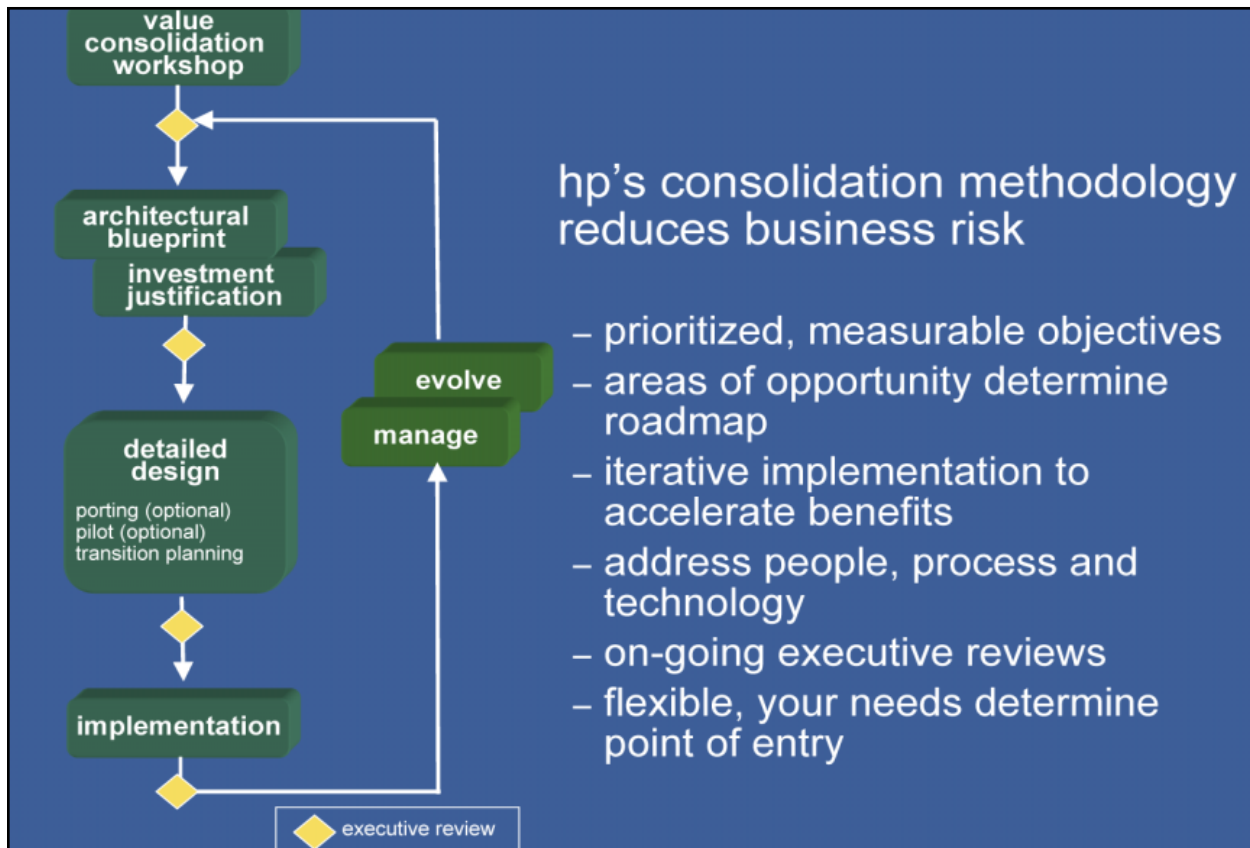

Figure 14

company. As Volker mentioned, this is not something that you want to do using a big bang approach. This is something that you look at in small pieces trying to balance the risk and the investment and trying to get the payback as quickly as possible from that investment.

The approach we would typically take is to start by doing some discovery work early on and then holding something called the value and consolidation workshop where we would bring together all the key stakeholders in the organization—your IT managers, the end users, et cetera. There we discuss and agree on objectives and try to come up with what the success factors are and the time frames for each of those objectives in consolidation. Then, we try to come up with opportunities to meet those objectives and come up with timeframes and independencies between those so that you'll have some ideas on how to move forward. Then, we try to take all those opportunities and come up with a series of smaller projects that we can get that quick return on investment and minimize our risks. Finally, before we close the workshop, we try to get an agreement from all the key stakeholders and players that are there on that

list of projects so that we can go forward with the next step which is to present it to executives within the company. If they're buying into it, then we move forward with two tandem processes, one of which is doing the high-level design for those projects, and along with that, doing an investment justification, kind of as a total cost of ownership analysis on those and trying to determine the ROI.

Then, we review it again with the executives and move into a detailed design phase where we look at the various tools for implementing each of those project plans, et cetera. Then, we have another review with the executives and then go into the implementation. This is an ongoing process after we've had our first number of successes, then we kind of go back in and continually move forward and refine the environments.

The next slide talks about various solutions available to help us on those consolidations. They vary quite a bit, from having your systems as isolated as possible to sharing a single operating system instance. All the way on the left, we've got a concept called the hyperplex which allows us to combine multiple systems, multiple operating systems with an
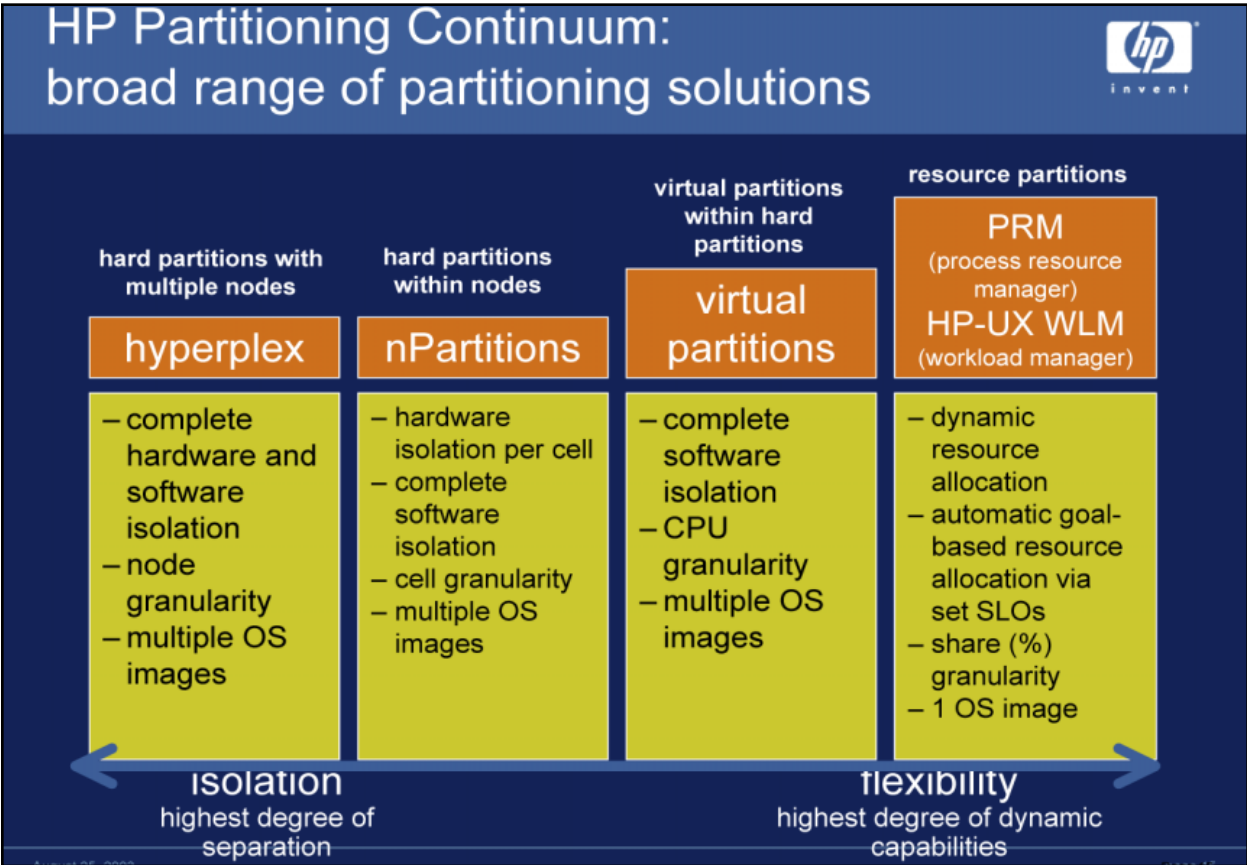

Figure 15

incredibly fast backend to link everything together.

Moving to the right we've got nPartitions, which are known as hard partitions within a number of our boxes including our Superdomes. Here we can assign a number of CPUs, specific amounts of memory, specific boards to each operating system instance and we can have a number of production systems physically isolated from each other where a complete partition could go down, a hardware issue or whatever else, and not affect the other partitions. But yet, being on a single physical box like the Superdome, that gives you a lot of flexibility to move things around.

Here we move on to virtual partitions, which gives you complete software isolation but gives you the ability to share your resources amongst your various partitions. You can basically assign x amount of CPU to one partition, x amount of CPU to another partition, x amount of memory to one partition, memory to another partition but yet have the ability to move that borderline and move resources from one partition to another more flexibly than with the hard partitions.

Then finally on the right, we have resource partitions commonly known as application stacking where we stack multiple applications all within the same operating system instance. This is something that you might have typically done in your sandbox development environment before. We've got a lot more flexibility now to manage resources within there. Before we might have, let's say, two sandbox instances running an operating instance and if one of them had a runaway process, it would chew up all the CPU in there. Or if it had a memory leak, it would chew up all the memory in the process there in that particular operating system instance. Now we've got some tools like Process Resource Manager to allocate a minimum amount of CPU to particular processes or Workload Manager saying, well, we want to guarantee x amount of response time for a particular process and try to manage the resources on the box to more equitably distribute them among the applications that are residing in that single operating system image.

The next slide talks about a similar tool for the Wintel platform, VMware and Vmware, just like the nPars and dPars in Unix allows multiple operating system images to run on the Intel platform. Things
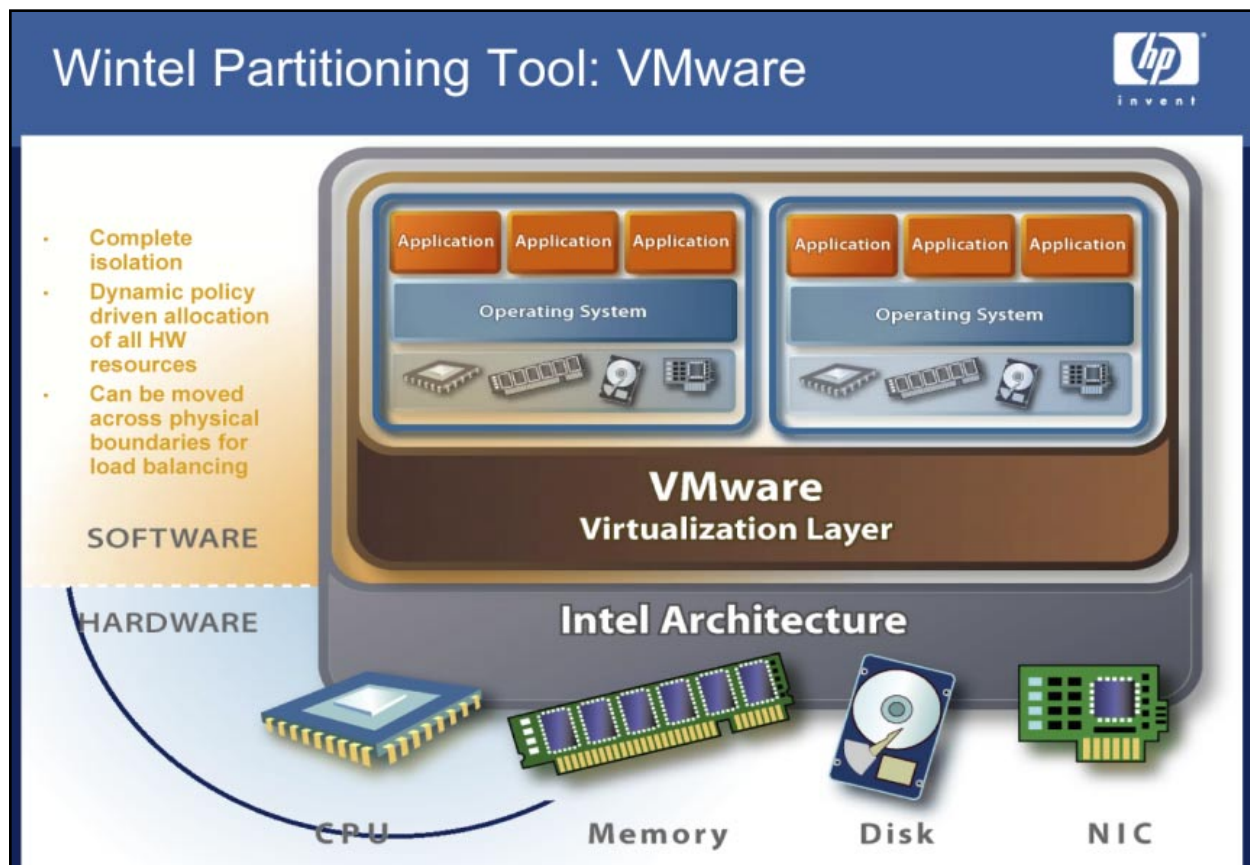

Figure 16

like Web servers are perfect candidates for where instead of having a dedicated server for each of these Web servers, you could create individual operating system partitions and have them run on a single box.

The next slide talks about storage consolidation and the use of storage area networks. With storage area networks, each system will have its own dedicated storage. Because each system didn't require a ton of storage, you might find that it wasn't used quite as efficiently as it could with the storage area networks. You might have some extra space on one system that you couldn't allocate to another system, and you might have everything allocated and assigned to only maybe a few platters instead of being able to spread it out across a ton of platters and the storage area networks. For instance, if application one had an immediate need for storage, you could take it from some unused storage that was assigned to system two and move things around much, much more flexibly.

The next slide talks about another dimension to that, where we look at not only consolidating a SAN, but also consolidating the different applications and putting them on the same set of physical disks. One of the latest best practices for disk layouts is striping near everything. It is really fantastic. About six years ago, one of our performance folks came to our implementation group and said, striping near everything. We said, "Are you crazy? SAP doesn't recommend that. They say put your reading logs over here, put your copies of your reading logs over here, put your SAP tables over here, put your indexes over here and keep everything separate." But after many years and many discussions that we've had, we've really learned that consolidating and striping near everything is the best practice. We've seen huge response time improvements by doing this. There are a lot of tricks to this, for instance like the production systems — keeping them on the outermost cylinders of the platters for better IO throughput, systems with less throughput requirements coming on innermost cylinders and kind of spreading things out. Spreading things across many more physical platters, we've seen some huge improvement in response time.

The other thing that we've been implementing quite a bit over the past few years is tape area networks. So this is a different twist on the storage area networks for tape. Before, you might have a dedicated number of drives — either, I guess DDFs or DLTs or SuperDLT directly connected with the
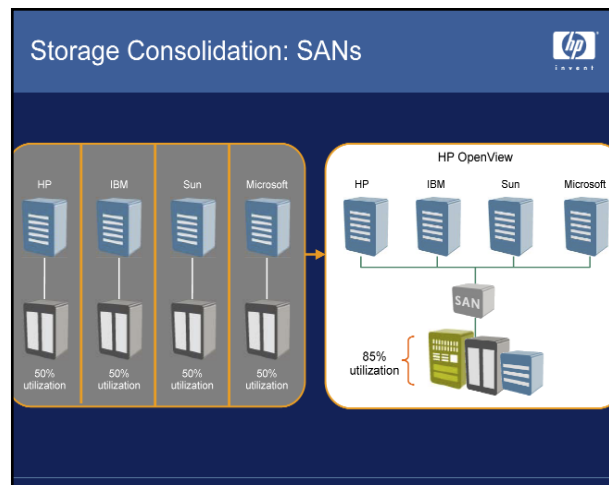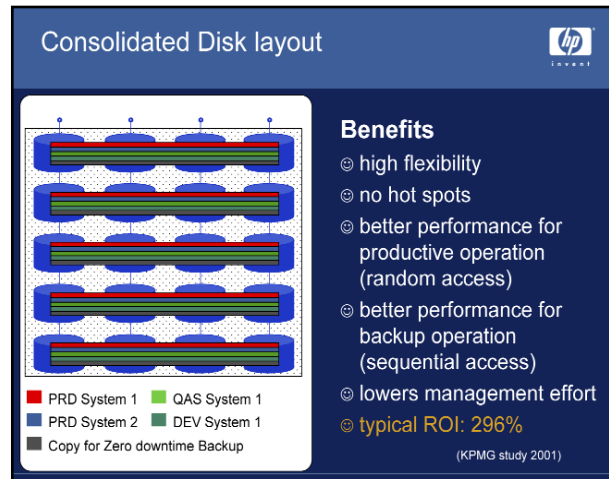

Figure 17

Figure 18

Figure 19

SAP IT Briefing:
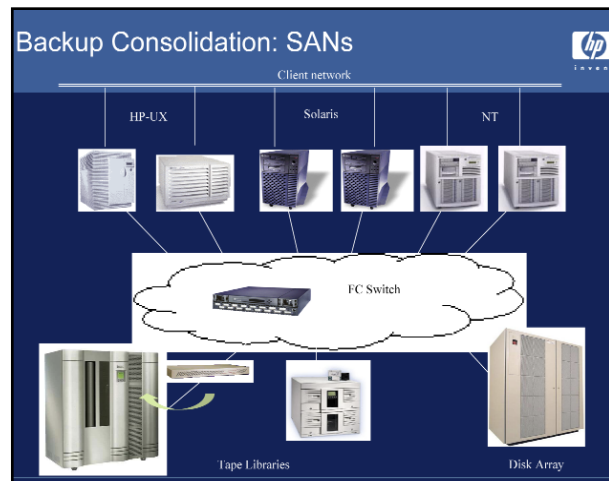**SAP System Consolidation, Benefits and Lessons Learned**

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SCSI connections to each of your servers for backups. Now through some of the new technology that's available with FibreChannel and fibre switching, we can go ahead and free the network for each of the tape drives, and a large tape library would look like it exists on every single box on that storage area network and through the use of intelligent software like HP Data Protector, and manage that environment. You could have every server on your storage area network have potential access to any of the tape drives in your tape libraries. There's a lot of flexibility and much better return on your investment in your tape hardware.

The other technology that we've been using quite a bit over the past many years is the zero downtime backup capability. This exists in many of the different vendor solutions out there where essentially you take your SAP database on the application server. I guess application server is a bad term; it should really be database server. Take all your table spaces, put them in backup mode, make them consistent and then on the disk array itself has an extra mirror of disks. The top form that's labeled "Apps" would be your primary disk for your database, which would be a normal mirror SAP.

But then, you have a third mirror, that number T down in the bottom that, once the table space is all put in backup, you'd split that up from the primary. Take all the table spaces out of backup mode, then mount that T copy of the database onto the backup server and then back it up to the tape library. One of the challenges lately is that more and more of our companies have been going global but trying to find a good window to do backups. Our users are starting to use them more and more, and as it's become more and more global, our peak times are distributed and spread out more and more. We've got a challenge just to try to find windows to do batch activity. To try to do backups on top of that tends to be very difficult. So, by offloading that extra backup port through a backup server, we've been able to manage some of our resources much better and minimize the impact on the applications or the database servers themselves from doing backups.

The next slide talks about high availability and some of the things we could do in that space as we look at consolidating. Before, where we might have had a dedicated server for failover or we failover to an app server, we now can failover, through the use of SAN technology, multiple applications like R/3, APO, BW, all to the same failover box. Because we were on the SAN, we could map those lines out to any of the boxes that are attached to it.
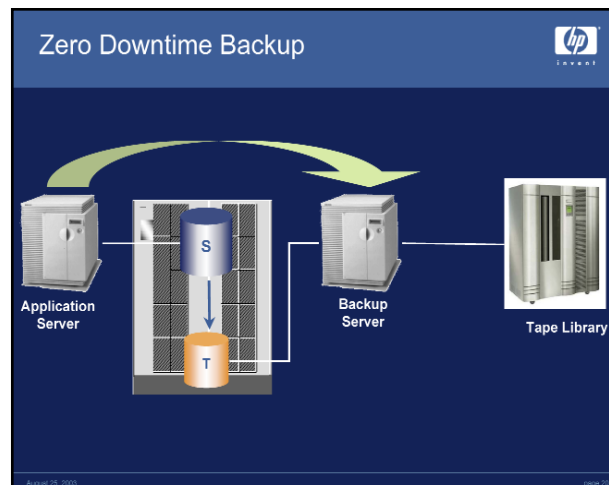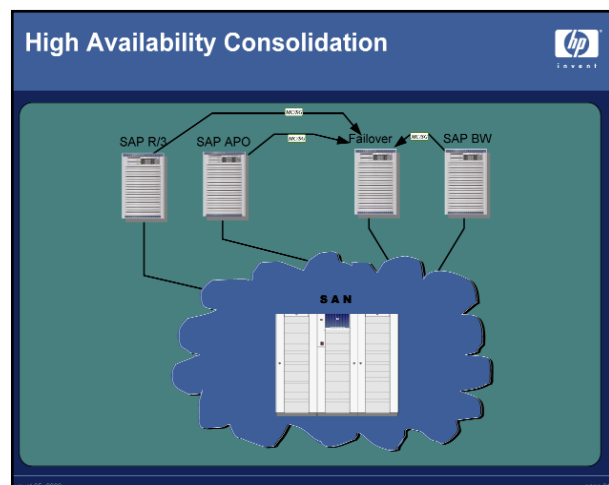

Figure 20

Figure 21

Another thing we've seen quite a bit lately is outsourcing and moving the hosting of the systems out to a third party provider. HP Managed Services provides a number of different outsourcing opportunities, either managing hardware onsite or remotely at one of their facilities. They can provide any level of system support from peer, light power, et cetera by Unix or Wintel system administration through database administration or SAP Basis. There are many different opportunities in a very flexible environment. They can customize SLAs to meet your specific business needs — very flexible on the investment themselves.

Either you can continue to own your assets, or HP can own the assets or a number of different leasing options are there. There are a ton of customers that are on different HP Managed Services data centers. A couple of them are within fairly close proximity to each other: far enough that if a disaster happened at one, the other would be protected, yet close enough

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Managed Services from HP

- "Traditional" outsourcing
  - -- managed on-site or at remote data center
  - -- you own the systems and infrastructure
  - -- can encompass multi-vendor platforms
  - -- HP delivers infrastructure support
  - -- HP delivers SAP operations support

- Hosting solutions
  - -- systems managed at HP data center
  - -- HP owns systems and infrastructure
  - -- built on industry-leading HP platforms
  - -- database and SAP operations delivered by SAP

Figure 22

Comprehensive Managed Services

- Tailored SLAs to meet specific business needs

- Flexible capital investment options:
  - – Customer continues to own assets
  - – Customer leases assets
    - Operational lease
    - Financial lease
    - Sale and leaseback
  - – Assets included in service fees

- Proven capabilities:
  - – $2 billion outsourcing business
  - – More than 400 customers
  - – More than 20,000 servers under management

Figure 23

Why HP Services for SAP Consolidation…

Offering the mySAP Business Suite end-to-end services you _need_:

➢ SAP IT Consolidation, Performance Assessment, TCO Analysis, Outsourcing, Monitoring, POC/Stress Testing, and more

➢ Deep SAP/SQL & SAP/Oracle installation, deployment, configuration, tuning, management, and troubleshooting skills

➢ Firsthand expertise in Windows, Linux and UNIX environments

➢ Certified Oracle DBAs, Microsoft MCDBAs and MCSEs, and more

➢ Direct access to the SAP, Microsoft, and Oracle Solution Centers, including SAP engineering, design, and configuration centers of expertise

➢ Access to the HP Global SAP Solution Center co-located with SAP AG in Walldorf

➢ Access to HP SAP-focused Storage, Database, Web, OS, and Server Hardware Specialists across North America

Figure 24

that we could take advantage of some of the disaster recovery tools like the business continuity techniques, like continuous access XP or we could mirror the primary system to another disk frame at the other site. If one of the sites went away for some reason, we could then start running the business from the other site. All of these sites are set up with redundant power, redundant telco, and redundant connections to the servers and half from one side of the row, half from the other side of the row. It's been very impressive to look at these sites. We just finished a project that's at one of the data centers up in Toronto and I was impressed with what I saw there. A number of these data centers were created for the banking and finance industry, which requires an incredible amount of high availability, and they're probably the best data centers ever seen.

Now, HP Services also brings a number of different things to the table that can help you with your consolidations. We've got very deep SAP and Oracle knowledge within the consulting practice: certified Oracle DBAs, certified Basis consultants, and very close relationships with the main vendors like SAP, Microsoft and Oracle. We've got the experience working over many years with different customers

with the best practices that we could bring to the table and how to best approach a consolidation project, how to optimize your IT environment and deploy solutions and also transfer that knowledge to your folks so that you can continue moving down that direction after our first few projects are completed.

Here's just a few of the different solutions that HP Services can bring to the table, from IT infrastructure deployments to upgrades, migrations, consolidations, capacity planning, performance tuning...a whole number of different things that we could assist your company with.

Now HP also has some unique technology solutions. Looking at the compatibility, being able to run multiple applications on a single box like the Superdome, where we can run Linux and Windows and HP/UX wrapped all in the same box. Then, remote access and our remote console access as we look at consolidating the servers to central locations. They might not necessarily be at the same place the system administrators are at and that's one thing that's helped us quite a bit. Remotely managing the servers from a console perspective, remotely

HP Services SAP IT infrastructure

- Design
- Supply
- Demand
- Infrastructure Services
- Support services
- Managed Services
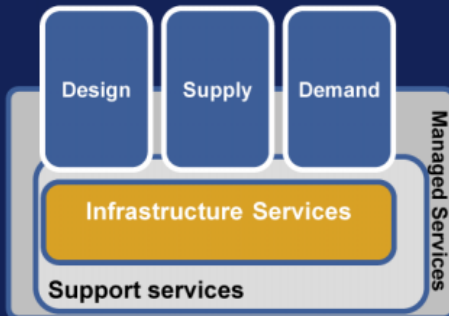
- mySAP Application Integration
- NetWeaver Components
- Rapid/IT for mySAP
- Transaction Volume Measurement Service (TVMS)
- Archiving services
- SAP upgrade services
- SAP migration
- SAP Consolidation
- Capacity & service level management (CSLM)
- ITSM services
- Storage solutions
- Output management solutions (Printing)
- Server platforms
- System Management, Openview
- SAP Accelerated Trainings
- Collaborative Business Integration (CBI.NET)
- Mobility solutions

Figure 25

why HP ?
unique HP technology enablers

multiple unique technology enablers -

only from **HP**

- HP PA-RISC & IA-64 binary compatibility
- Superdome – physical and virtual partitions
- HP memory windows
- HP POPS - performance optimized page sizing
- HP service control
- HP HyperPlex - scalability beyond the skins
- HP HyperFabric switch
- HP central web console
- HP performance domains
- HP multi-system workload management
- HP OpenView central systems management
- HP OpenView service management
- HP equation SureStore SANs
- Enterprise NetServers (8,16 and 32-way)
- HP equation SureStore XP enterprise storage server
- HP FibreChannel industry leadership

Figure 26

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Figure 27

managing the tape devices, storage, et cetera. worked out very nicely. We also offer great monitoring utilities like OpenView, resource management and storage management utilities.

Finally, HP also has unique processes that can help with consolidation and optimizing your environment, like high availability, trying to optimize your uptime as much as possible and there are all sorts of redundancy solutions that can be implemented helping with SLA management. Looking at things like HP Service Navigator, where you can look at all your boxes from the service or business perspective and see at any one point in time what the status of that is, and then also bringing to the table various consulting methodologies, outsourcing opportunities or various financing options for hardware and software and/or consultant services.

All right, that wraps up my set of slides and now I'll turn it back over to Dottie for questions.

We are now moving on to the live Q&A with you our audience. Please feel free to enter any questions you may have at this time by clicking on the "Ask a

Question" button in the lower left corner of your presentation screen.

I do want to give Volker and Ken just a moment to start reviewing your questions that have already started to come in while I give another quick thanks to today's webcast sponsor, HP. This webcast is presented to you today by HP. And as a special offer to today's webcast participants, HP is making available a number of white papers from Gartner and IDC to help you plan for and implement your own SAP consolidation. Also for a limited time, save an extra 20% on HP servers when you upgrade SAP R/3 and purchase a qualifying server. Click on the banner ad in the lower right corner of your presentation screen to download the white papers and get full details on the discount promotion.

Okay, Volker and Ken, back to you for the live Q&A session.

Question & Answer Session

JOEHNK: Thank you, Dottie, and I see a couple of questions coming in so let me start off with the first question from John Flynn. Ken, help me out and dive in if you have any additional comments.

John asked about the human and organizational challenges we have encountered with the consolidation.

A. And yes, we've had some challenges. Not necessarily resistance to change, but there were a lot of concerns about that and the way we addressed this typically is through communication among and within the teams. When it comes to the business, we have a model in place where we have dedicated operational IT account managers who are our interface to the business. So if I'm the business and if I'm concerned, I typically go to my dedicated Ops account IT manager and I will share my concerns, and the Ops IT account manager will take care of it. So from a communications point of view, we have done these kinds of measures in order to minimize any risks and challenges we have with these consolidations.

And the questions about forced moves? Yes, the – sometimes the work shifts of individuals but we address this, but layoffs… Typically we don't have any layoffs in these kinds of scenarios.

Are there any other comments from your perspective, Ken?

A. No. I think that's a pretty good summary.

And, John, if you want to get more details, you're free to touch base with Ken or with Jesse and you will see one slide will show the contact names on the HP side.

Q. Another good question is, and this is coming from Jackie, she asks us about how do we handle the missing windows for maintenance?

A. This topic would last, I would say, a minimum for a two-hour session, Jackie. Let me summarize this as quickly as possible. We typically have a planned downtime window of eight hours per system a month. So the overall downtime we have per year is 96 hours. Within the eight-hour downtime window, six hours are reserved for

maintenance and two hours are reserved for moving to production, so we have developed some techniques, really, to shrink down the maintenance and the move to production windows, as we call it. To give you a kind of idea of when it comes to maintenance windows, typically what we do is we use online reorg tools in order to reorg the tables so we don't have any offline reorgs, because we cannot afford this because offline reorgs would mean taking the system down.

So if you have more specific questions about the techniques, again, I would suggest that you touch base with Jesse or some of the HP folks and we can certainly assist and help you in terms of giving you a kind of ideas on how we have optimized and shrinked these downtime windows.

Another — Yes, go ahead.

Q. Next there's a question from Houston, Sara: what was the impact of system performance and what do you feel were the factors that influenced the impact?

A. Looking at system performance, we just finished a project up north where we consolidated production environments about ten production servers down to two. Because of the advances of technology and CPU horse power, SAN, and IO throughput that we've gained by distributing disks across many more spindles and distributing that with the other systems, we were able to see huge performance gains. When we first approached this design with the customer, they couldn't believe us. You can't take that many boxes, that many CPUs and consolidate the two different operating system instances and see that much performance improvement, but we did. You know, we went and we saw better than a full tenth in response time improvements from this recent technology refresh and consolidation.

Q. All right, another question came in from Steve Fulder about what are the key issues with running multiple lines on a single hardware instance?

A. One of the key issues you're facing is the maintenance window because you need to coordinate those maintenance windows among the clients. So what it means is: if you have hardware

maintenance to perform, you need to take down the entire system. So multiple clients are impacted. If the multiple clients are on different regions, then you need to coordinate the downtime windows, which is a challenge. As a matter of fact, we experienced these kind of things and it took us quite some time to get these issues addressed, but this is for me, I would say, the key issue if you utilize the multiple client concept for — between regions.

Q. Another question came in. How to migrate our three BW, CRM, and APO into one system using MCOD?

A. That's a question I cannot answer easily. I would say, touch base with Ken or with Jesse to give you more details on what HP can offer. We, from IPG IT Americas, have basically no experience with this kind of feature.

There's a real good OSS note that describes the process or if you contact our organization, we'd be glad to walk you through that as well.

Q. Another question came in from Steve Johnson asking that they have four SAP landscapes on a 4.0b client, wants to consolidate to one SAP with business data configuration upgrade to 4.6x with having all data. Is this possible?

A. I don't want to get philosophical. Everything is possible. I think this is a question that really needs to be investigated in what kind of options and opportunities you have. I've seen similar questions before saying, should we go from upgrade to full consolidating things or should we go and consolidate first before we go to an upgrade? It very much depends on the situation you are in. To give you one example, it depends how clean your SAP instance is in terms of customization. There are a lot of things that need to be factored in and I think I mentioned this in another session, but I typically do not see any kind of cookie-cutter concept where you say you need to do this in order to achieve certain results. It very much depends on the situation you face on the health of your systems and the environment you have and the business you support

Q. Another question came in about multiple clients' production system managing client independent changes.

A. Yes. Big challenge, especially when we touch client-independent tables. As a matter of fact, from a

development perspective, we have a process in place where we basically manage those kinds of change requests so that we typically do not override or change existing entries. I would say it is more or less an organizational issue rather than a technical issue and it can be controlled by a process and by limiting, I call it now, a user access or developer access when it comes to profile changes. In other areas we have typically one or two key people who are overseeing those kinds of changes, and they are basically empowered to approve those kinds of changes and be the point of contact. So, again, it is more or less from a process organizational perspective where we have addressed those kinds of things.

JOEHNK: There are a lot of questions about getting a soft copy of the presentation so I don't know at this point how we want to proceed on this.

I think, again, if there are any questions, I would point it to Jesse and Ken or someone should share the last slide outlining the contacts from the HP site.

GAZAREK: In terms of a soft copy, there's actually a white paper that's going to be produced that will be online on the SearchSAP.com site, and it usually takes about four to six weeks to take the transcript and put it all into a white paper format. But it will be available. If you need information ahead of time, feel free to use any of the contacts that are up on the screen now.

JOEHNK: One question was about the multi-vendor data center and let me elaborate a little bit on this and Ken pointed to a data center we, HP, happen to run for them. As a matter of fact, it's a multi-vendor data center, so HP supports even on HP hardware and equipment in this particular data center, so there are a bunch of opportunities even if you are on non-HP equipment to consider those kinds of opportunities. As I mentioned when I worked in this data center I've seen at least products from five or six competitors running under this particular data center and it's a very, very impressive data center. As Ken pointed out, the data center primarily supports the banking and finance industry, which has very specific requirements when it comes to availability and DRP and failover.

All right. I think that's, in terms of questions, Ken if you see any other questions you want to answer?

GAZAREK: No, I think that's about all of them.

MODERATOR: Okay, great. Thanks so much, Volker and Ken.

Well, folks, that concludes today's webcast, "SAP System Consolidation: Benefits and Lessons Learned."

If you'd like to review today's material at some later date, an archived version of this webcast will be made available on SearchSAP.com's online webcast page within the next 24 hours.

I would like to give a final thinks to our guest speakers, Volker Joehnk and Ken Gazarek for their time, knowledge and expertise today. We really appreciate you joining us. A very special thanks to our sponsor, HP, for bringing us this presentation. I thank you all so much for joining us today and I wish you all a good day.

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