

# Fostering innovation with near real-time retail inventory management using SAP HANA on IBM Power Systems







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Head of ERP Processes  
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## About this paper

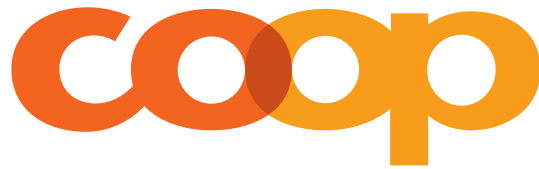
To meet growing customer demand for a more flexible shopping experience, Coop Group wanted to offer click-and-collect services for a wide range of products—but how could it ensure stock is at the right place at the right time? The company needed to improve its planning processes by gaining near real-time insight into inventory levels, which entailed processing huge volumes of operational data. To achieve this, Coop Group is now leveraging the SAP Customer Activity Repository application powered by SAP HANA running on IBM® Power Systems™ in a single-instance, scale-up implementation. The application is integrated into a comprehensive SAP solution landscape based on SAP for Retail, SAP Business Warehouse, and related SAP applications.

### Customer Objectives

- *Improve customer satisfaction by expanding classical retail business models with an omnichannel shopping experience where consumers can order via mobile and online, and collect purchases at the nearest store.*
- *Provide reliable, near real-time inventory data in the online store at any time for a better customer service.*
- *Sharpen its competitive advantage and gain new customers with a fully integrated omnichannel offering that uses Coop Group's large network of stores across Switzerland effectively.*
- *Scale up SAP HANA instances seamlessly to support 30% data growth per year.*
- *Support innovation, and shorten the time to market of new features and tools by being able to provision development systems quickly when needed.*
- *Improve resource efficiency and application performance to give operations a boost.*

### IBM and SAP Solution

- *A wide range of SAP solutions, including SAP for Retail with SAP ERP, SAP ERP Human Capital Management, SAP Customer Relationship Management, SAP Forecasting and Replenishment for Retail, SAP Global Trade Services, SAP Hybris, and SAP Supplier Relationship Management.*
- *SAP Business Warehouse and SAP Customer Activity Repository applications powered by SAP HANA.*
- *Advanced virtualization with IBM® PowerVM® Enterprise Edition, including dynamic resource allocation, micro-partitioning, Capacity on Demand and IBM PowerVM Live Partition Mobility.*
- *Four IBM Power® System E880 servers for SAP HANA with SUSE Linux Enterprise Server for SAP Applications.*
- *Four IBM Power System E880 servers for SAP applications and Oracle Database instances running on IBM AIX®.*



### Customer Benefits

- *Increased inventory control enables click and collect services: customers can pick up online orders wherever and whenever they choose, increasing reach and satisfaction.*
- *Improved planning and distribution processes based on near real-time insight into inventory data, supporting digital transformation initiatives.*
- **5x faster** *inventory analytics enables Coop Group to use up-to-date operational and customer data more effectively.*
- *Improved scalability allows Coop Group to hold 9-12 months of SAP Customer Activity Repository data in memory instead of just three, enabling easier reporting across multiple months.*
- **20x faster** *provisioning of large SAP HANA systems increases Coop Group's ability to innovate, boosting business agility.*
- *Reduced data center complexity for SAP Customer Activity Repository by moving from eight-node scale-out architecture to single-node scale-up configuration, making scalability faster and simpler with IBM Power Systems Capacity on Demand.*
- **85% reduction** *in processor cores for SAP Business Warehouse while increasing performance and memory capacity by replacing an SAP Business Warehouse appliance based on x86 processors with SAP HANA on the IBM POWER platform.*
- *Increased system performance **by a factor of 5** by migrating the SAP HANA database for the SAP Customer Activity Repository application from x86 servers to IBM Power Systems while reducing number of processor cores **by 70%***
- **34 times better** *disk throughput and 50% reduction in disk latency, measured using the SAP HANA Hardware Configuration Check Tool, enable Coop Group to use available storage bandwidth and computing capacities more efficiently.*
- *Realized value rapidly by completing the complex migration within two months.*



## Background, starting point and objectives

### About Coop Group

Operating more than 2,200 branches and outlets across Switzerland, Coop Group is one of the country's largest supermarket chains. The company manufactures, distributes and wholesales foods, delivering goods to restaurants, hotels and staff cafeterias across Europe.

Headquartered in Basel, Coop Group has around 2.5 million cooperative members and employs almost 85,000 people, generating annual sales of CHF28.3 billion (USD28.1 billion).

### Business challenges and project objectives

Coop Group needed to adapt to changing customer behavior. With online and mobile shopping now commonplace, consumers have high expectations of retailers. To ensure customers stay with Coop Group and to attract new customers, the company wanted to allow consumers to browse products and check availability, select and buy items online or via mobile, and then collect their purchases at the most convenient local store at a time that fits best for them.

To offer customers this new flexibility, Coop Group launched an omnichannel strategy that ties online and in-store retailing closely together, and decided to utilize its comprehensive network of stores across Switzerland to roll out the click-and-collect offering. However, this new integrated service substantially increased the complexity of inventory planning and the requirements for near real-time insight into stock levels across all locations at Coop Group.

Thomas Vielhauer, Head of ERP Processes at Coop Group, elaborates: "It is a major challenge to ensure that inventory information is accurate and that the products a customer has ordered online are actually available for collection in their preferred store at their preferred time. To offer this service, we needed to transform our business processes and gain current information about stock levels at all locations, requiring very fast and powerful technology."

The rapid growth of data volumes across this complex, integrated business led to higher utilization of Coop Group's IT systems. Easy scalability and streamlined system administration therefore became a key concern for the company.

Christoph Kalt, Lead IT Architect at Coop Group, explains: "With data growth of 30 percent each year, we needed a flexible IT solution with the ability to support our retail strategy including our omnichannel efforts without impacting business processes, increasing costs, or adding to the management and administration workload."

To unlock new business opportunities and stay ahead of the competition, Coop Group also wanted to use the system to develop and test new commercial ideas rapidly and cost-effectively. Cutting the time to market of new, innovative service offerings is crucial to success in the fast-moving retail marketplace.



### Initial IT environment

Coop Group runs a full suite of SAP applications to manage its business. A few years ago, the company had successfully consolidated around 300 SAP application servers and databases from dedicated systems to the IBM Power Systems platform, using advanced IBM PowerVM virtualization technology. Coop Group has been running its SAP application servers and Oracle Database instances on IBM AIX ever since. Having initially migrated to IBM Power 795 servers, Coop Group now runs its SAP landscape on four IBM Power System E880 servers with IBM POWER8® processors. Using the IBM Power Enterprise Pool feature, to maximize efficiency the company can flexibly shift workloads with the required processing and memory capacities between all four servers.

The application landscape at Coop Group comprises SAP for Retail with SAP ERP, SAP Customer Activity Repository, SAP ERP Human Capital Management, SAP Supplier Relationship Management, SAP Customer Relationship Management, SAP Forecasting and Replenishment for Retail, SAP Business Warehouse, and SAP Global Trade Services, as well as the SAP Hybris e-commerce solution.

To accelerate data analytics, Coop Group had implemented an SAP Business Warehouse Accelerator solution based on 768 x86 processor cores with a total memory of 3 TB, running 64 separate operating system instances.

For its SAP Customer Activity Repository, Coop Group had deployed a SAP HANA database. The company was running its large environment on a scale-out appliance solution without virtualization. To handle its 3 TB SAP HANA database, the company operated an eight-node cluster with 320 x86 cores in total.

The total workload was becoming a real challenge for the systems running the SAP Customer Activity Repository application. Christoph Kalt comments: "In the past, we had to cut down the volume of data we used for SAP Customer Activity Repository analytics because of the limitations of the platform. This made it difficult to gain a near real-time overview of inventory movement."



## Technical solution

When Coop Group looked at expanding its SAP HANA environments to drive its transformational strategy, it decided to simplify the underlying server architecture, and standardize its SAP infrastructure landscape across all solutions and applications. This meant moving its SAP HANA databases to IBM Power Systems servers.

Thomas Vielhauer remarks: “Knowing the reliability and low administration requirements of the IBM Power Systems platform from previous experience with our major SAP applications and databases, we were curious to see how SAP HANA would perform on high-performance POWER8 processor-based servers.”

Coop Group worked closely with teams from IBM and SAP to migrate its mission-critical SAP Customer Activity Repository and SAP Business Warehouse applications to SAP HANA running on IBM Power System E880 servers.

Christoph Kalt recalls: “We were able to complete the implementation and migration extremely quickly, in less than two months. Everything went very smoothly, and we were glad to have the support of both IBM and SAP during the migration of such large, business-critical systems.”

## Server architecture

Sizing the new servers to run several large SAP HANA databases together with the SAP application servers, Coop Group deployed four IBM Power System E880 servers with IBM POWER8 processors. The servers have been installed in two separate data centers to provide redundancy at both locations. Because the data centers are 130 km apart, all data is synchronized between the two locations via asynchronous storage mirroring. A manual failover procedure ensures business continuity in the event of disaster at one of the sites.

The company runs its SAP HANA databases on IBM Power Systems servers with SUSE Linux Enterprise Server for SAP Applications. This is an optimized operating system platform, validated and certified by SAP. SAP and SUSE collaborate on its development to achieve the best possible performance for mission-critical SAP applications. The optimizations include a kernel tuning option for improved page cache performance, and simplified installation procedures for SAP HANA to speed up new deployments. Additionally, SUSE Linux Enterprise Server for SAP Applications has a dedicated update channel to deliver patches, fixes and updates to features specifically for SAP applications. To reduce the business risk further, the solution also offers access to seamless, integrated priority support from SAP and SUSE.

Christoph Kalt elaborates: “Because of our extensive experience with fully virtualized IBM Power Systems running IBM AIX, we already knew how the platform works. So we could build on our knowledge of concepts and configurations from our IBM AIX environment, and use this experience for the new SAP HANA solution with SUSE Linux Enterprise Server for SAP Applications running on IBM POWER processors. This helped us to get started quickly, and facilitated the streamlining of operations and management processes.”

Thomas Vielhauer comments: “Having all of our SAP applications—those running on SAP HANA and those on traditional databases—on a single server platform has standardized our IT infrastructure. This helped to significantly reduce the time spent on management and maintenance.”

Taking advantage of the advanced IBM PowerVM virtualization capabilities, the team set up dedicated logical partitions (LPARs) for the SAP HANA databases to ensure optimal performance at all times. The two largest SAP HANA databases run on LPARs with 96 IBM POWER8 processor cores, configured in dedicated-donating mode.

For the application servers, Coop Group configured shared processor pools on each machine. When the load is low, the two large partitions also donate spare processing cores to the shared pool. Combining dedicated and shared logical partitions enables the company to use the available computing and memory capacity very flexibly. These dynamic logical partitions can use more processor cores or memory out of the shared resource pool when needed, without manual performance tuning. IBM PowerVM automatically assigns available and unused server resources to the logical partitions with the highest load, helping to boost performance and minimize manual administration requirements.

Increasing the flexibility further, Coop Group can easily move active logical partitions between the two servers at each location without disruption of applications or databases for staff, users or customers. The IBM PowerVM Live Partition Mobility (LPM) feature supports smooth system maintenance, as the team can avoid most planned downtime. In combination with IBM Power Systems Capacity on Demand, the company can temporarily increase the number of processor cores and memory to cover maintenance or other activities, and run more systems than usual on one of its IBM Power System E880 servers.

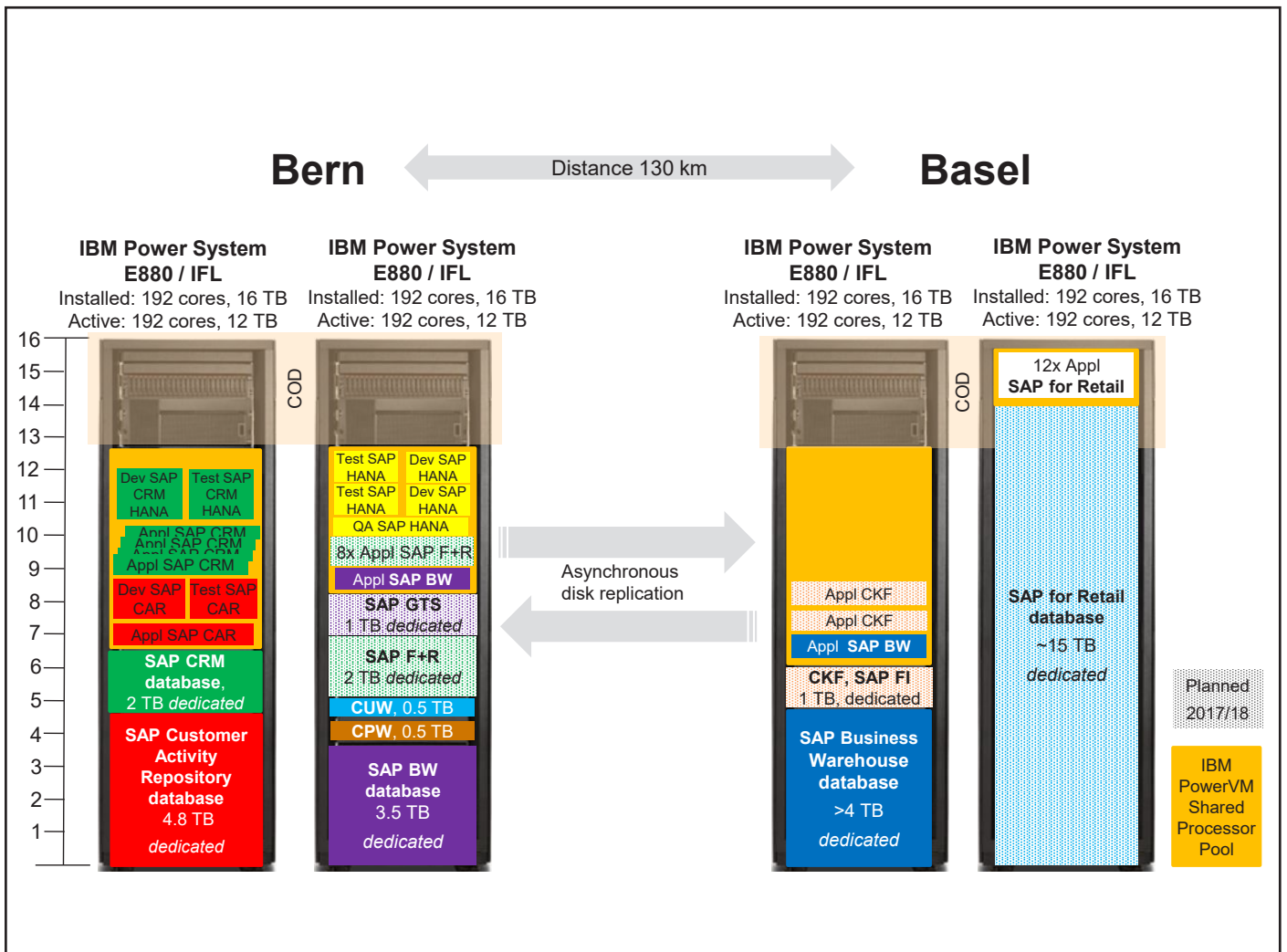


Figure 1: IBM PowerSystems configuration for SAP HANA.



*“Instead of running eight servers for one large SAP HANA database for our SAP Customer Activity Repository, we now just need a single instance. We can flexibly scale up, if needed, by pushing a button, and within minutes.”*

Christoph Kalt  
Lead IT Architect  
Coop Group

Christoph Kalt comments: “The advanced virtualization capabilities and easy scalability of the IBM Power Systems platform was a key factor that went into our decision to move our SAP HANA environment.”

At the moment, Coop Group keeps the logical partitions running SAP HANA with SUSE Linux Enterprise Server for SAP Applications and the partitions running the IBM AIX operating system on separate physical servers. If the company ever wanted to consolidate its infrastructure more comprehensively, Coop Group could also mix logical partitions with different operating systems (such as IBM AIX and Linux) on a single IBM Power System E880 server.

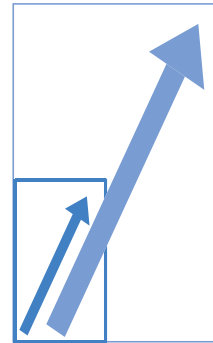
#### **SAP HANA on IBM Power Systems architecture**

Leveraging the flexibility and performance of IBM Power Systems, Coop Group implemented its SAP HANA applications in a SAP HANA Tailored Datacenter Integration (TDI) configuration. The fully virtualized environments benefit from all of the built-in reliability and performance features of the IBM Power System platform.

In close collaboration, Coop Group, IBM and SAP migrated the company’s SAP Business Warehouse to SAP HANA running on IBM Power Systems.

Coop Group also migrated its SAP Customer Activity Repository to SAP HANA on IBM Power Systems. Christoph Kalt explains: “Partitioning some tables in a SAP HANA cluster can be tricky, and because a master node and a backup node were required, we could not use the full capacity of the solution. By moving to IBM Power Systems, we wanted to reduce unused resources and avoid paying for capacity that we could not really use.”

Thomas Vielhauer confirms: “To support the long-term success of our business strategy, extensibility was one of the main drivers for moving our SAP Customer Activity Repository application to SAP HANA. We could not simply add a new node to our existing cluster, because the vendor no longer offered exactly the same server

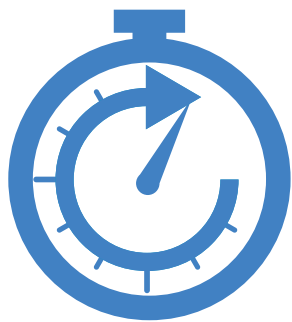


**35x** better disk throughput  
and **50% reduction** in disk latency



*“With IBM Power Systems and PowerVM virtualization, we can provision resources much more efficiently.”*

Christoph Kalt  
Lead IT Architect  
Coop Group



**20x faster** provisioning  
of large SAP HANA systems

hardware. Since mixing different nodes was also not an option, we would have had to replace the entire cluster just to add extra capacity—not a very cost-efficient proposition. Being able to activate more processor cores and memory whenever needed over the full lifetime of the servers helps us to protect our investment much more effectively. This makes IBM Power Systems the preferred platform for our rapidly expanding SAP HANA environment.”

With IBM PowerVM, Coop Group can deploy larger virtual machines to meet the company’s business requirements. A non-disruptive growth path for the systems increases overall availability and reduces business risk. Installing fewer physical servers reduces the manual configuration workload—including routine tasks such as cabling, connecting power supplies and setting up network equipment.



### Project achievements

The company gained near real-time insight into inventory data, helping to improve planning and distribution processes, and support the company's digital transformation initiatives.

Christoph Kalt says: "Inventory management and analytics are now five times faster with SAP HANA running on IBM Power Systems. This allows our planners and analysts to use up-to-date data about stock levels more effectively. Together with collection of inventory data, this means that we can run planning analytics much faster, so that we can streamline our processes and be sure of reliably getting the right products to the right branches at the right time."

In the past, Coop Group could only hold and analyze three months of data in the SAP Customer Activity Repository. Now, running the application on SAP HANA on IBM Power Systems, the team can analyze 9 to 12 full months' worth of data, enabling them to gain more meaningful insights into business performance and efficiency.

The biggest achievement, however, is probably the simplification of Coop Group's SAP infrastructure. By moving from a complex scale-out x86 cluster system to a scale-up, the company can operate its largest SAP HANA database much more easily.

Christoph Kalt says: "Instead of running eight servers for one large SAP HANA database for our SAP Customer Activity Repository, we now just need a single instance. We can flexibly scale up, if needed, by pushing a button, and within minutes. This is thanks to Capacity on Demand capabilities that enable us to activate additional processors and memory as needed. Having fewer servers reduced our physical footprint by 50 percent, saving us a great deal of floor space and halving energy costs."

*"Inventory management and analytics are now five times faster with SAP HANA running on IBM Power Systems. This allows our planners and analysts to use up-to-date data about stock levels more effectively."*

Christoph Kalt  
Lead IT Architect  
Coop Group



Easy reporting across **9-12 months**  
instead of just 3 months

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*“Because of our extensive experience with fully virtualized IBM Power Systems running IBM AIX, we already knew how the platform works. So we could build on our knowledge of concepts and configurations from our IBM AIX environment, and use this experience for the new SAP HANA solution with SUSE Linux Enterprise Server for SAP Applications running on IBM POWER processors.”*

Christoph Kalt  
Lead IT Architect  
Coop Group

Christoph Kalt explains: “With IBM Power Systems and PowerVM virtualization, we can provision resources much more efficiently. If we needed to provide new large SAP HANA production systems in the past, we would have to buy, install and configure new physical appliances. Today, we can simply set up new logical partitions as and when needed, making the process of provisioning new large SAP HANA systems up to 20 times faster—a huge improvement. Being able to make resources available more quickly in this way enables us to react faster to changing customer requirements and business demands, and roll out innovative new ideas like click-and-collect services.”



### Performance improvements

Quick processing and interchange of data between various systems are critical to success in the fast-paced retail market.

After moving to SAP HANA on IBM Power Systems, Coop Group benefits from a range of clear performance improvements.

By migrating from SAP Business Warehouse Accelerator to SAP HANA running on IBM POWER8 processors, Coop Group cut the number of processor cores by 85 percent, while increasing performance by more than a factor of five.

Similarly, by moving the SAP HANA database supporting its SAP Customer Activity Repository application to IBM Power Systems servers that have more advanced IBM POWER8 processors, the team reduced the number of processor cores by 70 percent and boosted performance by a factor of five.

To run a SAP HANA TDI solution, Coop Group had to complete a number of SAP tests with the SAP HANA Hardware Configuration Check Tool (HWCCT) and make measurements to confirm that its configuration met the minimum requirements for SAP HANA to run smoothly. The team was impressed to find out that on IBM Power Systems, disk throughput is 34 times better and disk latency is reduced by 50 percent. Christoph Kalt comments: "The IBM POWER8 architecture indeed offers excellent I/O performance, making it a good match for demanding, mission-critical workloads."

*“Having all of our SAP applications—those running on SAP HANA and those on traditional databases—on a single server platform has standardized our IT infrastructure. This helped to significantly reduce the time spent on management and maintenance.”*

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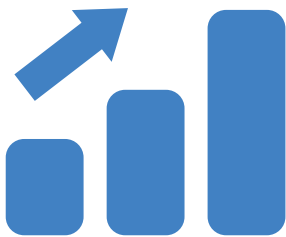
**85%** reduction in processor cores  
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**5x faster**  
inventory analytics

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#### **Next steps**

Coop Group is highly satisfied with the reliability and performance of SAP HANA on IBM Power Systems. The company is already working with IBM and SAP to move its SAP Customer Relationship Management application to SAP HANA with a planned memory size of 2 TB, to get faster access to customer information and to take full advantage of sophisticated customer analytics features. Following that migration, Coop Group also intends to move the large database supporting its central SAP ERP application to SAP HANA in the medium term, which should require approximately 15 TB of SAP HANA memory according to the current SAP HANA sizing report.

Christoph Kalt summarizes: “After the positive experience of running our huge SAP Business Warehouse application on SAP HANA on IBM Power Systems, we are confident that we can also use this platform for our even larger SAP ERP application where 24/7 reliability is absolutely essential.”

Thomas Vielhauer concludes: “Taking everything into consideration, from investment costs to operating costs, scalability and administration, IBM Power Systems was the best solution for our SAP HANA databases.”





Moving from eight-node scale-out to **single-node scale-up configuration**

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