“With development & application of information technology in management and service for small and medium-sized cities, information construction will focus on information technology cloudization construction in the next few years. Due to difference in background, time, requirements, hardware running environments and service process of information system construction for small and medium-sized cities, it is very important for efficiency improvement and effective execution of management and services to integrate numerous system data and guarantee data security. Phegda collaborates with Intel to create a new PBData Database Platform configured with the new generation of Intel® Xeon™ processor E5 v4 product family and Intel® SSD S3510 series to give information system a powerful computing processing capability so as to ensure highly-efficient stable converged cloud operations. By virtue of Intel’s technical supports, the PBData Database Platform integrates software & hardware resources into a dynamically scalable resource pool with high performance and openness to support rapid go-live and deployment time reduction by 65% of new service systems. Due to collaboration with Intel, the global leader in the information industry, Phegda works smoothly in information system cloudization construction for small and medium-sized cities and will continue to work together with Intel to make contributions to the development of these cities!”

Challenges

In the past information system construction for the small and medium-sized cities, multiple in-service information systems are deployed on different hardware platforms at different locations in order to ensure continuity and independent running of service. Each system is divided into service platform and database platform. Take Foshan Public Security Bureau “General Management Information System for Floating Population and Rental Housings” for an example, the service platform is deployed on dual-machine cold-standby X86 servers while database platform on standalone IBM RISC server, and data are stored on the EMC storage equipment (as shown in the Figure 1).

Along with increasingly growing basic data, the information system faces severe challenges during application due to restriction by budget and technology at the beginning of system construction.

Figure 1 Original General Management Information System for Floating Population and Rental Housings
• The EMC storage equipment fails to meet needs and is badly in need of capacity expansion. Currently, data has been up to 1.2T on the system with an increase of 20-30G data each month. Plus redundancy, it is possible to meet storage needs in the next 3 years when the expected storage space is up to 4T.

• The original system is deployed in a single-machine single-cabinet mode of IBM RISC server + EMC storage, featuring high risk in single point of failure.

• The original system uses traditional “centralized + closed” SAN architecture. Its storage controller I/O bottleneck severely restricts system performance extension, and it is very inconvenient because performance upgrade and storage space expansion can be achieved by replacing device only.

• Slow go-live of new service systems. A hardware platform must be constructed for go-live of new systems each time.

Solution

Phegda provided a PBData Database Platform for cloud-enabled database scenario to meet user’s requirements. By adopting Intel® Xeon™ processor E5 v4 product family and Intel® SSD S3510 series, PBData Database Platform provides a powerful computing processing capability and utilizes SmartCache technology to speed up execution of system programs, significantly enhancing system performance. By virtue of the open x86 converged architecture, the platform supports on-demand multi-dimension elastic scalability and near-linear performance enhancement along with capacity. Simultaneously, it is compatible with several mainstream databases and also achieves pre-authentication, tuning, end-to-end one-stop deployment and uniform visual monitoring on the whole platform. The converged architecture, compared to the traditional one, provides an integral converged cloud platform with high performance, availability and cost-effectiveness as well as convenient management to information system construction for the small and medium-sized cities.

Take “General Management Information System for Floating Population and Rental Housings” for an example, Phegda used PBData Database Platform V2200 (2 compute nodes + 3 storage nodes) to replace the original system architecture to help the security detachment to achieve upgrade of the general management information system for floating population and rental housings (as shown in Figure 3), not only satisfying requirements for database platform standby construction and uniform converged database creation but also further optimizing the entire IT architecture of the security detachment.
Technical Superiority

Intel® Xeon™ Processor E5 v4 Product Family

Intel® Xeon™ Processor E5 v4 product family is designed for 2-way servers and possesses 20% more kernel and cache than the last generation to support faster memory. The series also utilize integration technology to significantly speed up such key workload as database transaction and vector operations. The series possess Intel® Quick Path Interconnect (QPI) technology to achieve rapid, elastic system communication capability and up to 9.6 GT/s QPI for each path. Moreover, the series integrate Intel® Resource Director Technology which can provide deeper visibility and control & share platform resources to achieve smarter scheduling.

Intel® SSD

Due to low TCO, high liability and powerful data protection, Intel® SSD DC S3510 series can optimize data centers and cloud and run smart systems for read-intensive applications (e.g. guide, Web server, OS, operational database and analysis). The series achieves significant performance enhancement for data centers due to their up to 500/460 MB/s read/write throughput and up to 68,000/20,000 4K random read/write input/output per second (IOPs). Applications achieve a maximum read latency of 500 μs for most of the time (99.9%) and benefit from 55 μs typical latency. The series combines high performance and low activity power consumption (lower than 5.6 watt) to meet data centers’ stringent requirements with low TCO, so they are the most suitable for upgrade of servers or applications.

Users Benefits

• High performance and capacity

The PBData Database Platform utilizes the new generation of Intel® Xeon™ Processor E5 v4 product family and RAC architecture, giving it an excellent performance. Its three storage nodes use a secure data backup ratio 1:2 to conduct data backup so as to enable the actual available storage space to far more than the expected.

• High availability and reliability

In the original system, both servers and storage equipment conduct single-point running, bringing great hidden problems and making equipment failure rate increase linearly along with service time. However, the PBData Database Platform is deployed with fully redundant architecture without any single-point device and enables data to be stored at three different nodes so as to ensure data reliability and service continuity. Moreover, if failure occurs, data self-recovery mechanism will be triggered automatically and RAID will be reestablished at a speed over 5 times the traditional reestablishment so as to achieve high-availability protection for the whole platform.

• Linear performance enhancement

The original system uses traditional “centralized + closed” SAN architecture. Its storage controller I/O bottleneck severely restricts system performance scalability. However, the PBData Database Platform is deployed with high-performance InfiniBand technology and SmartCache mechanism to give the system a flash-grade I/O processing capability so as to achieve quick response. Based on the
converged architecture, the platform utilizes Scale-at-will distributed architecture to support on-demand multi-dimension elastic scalability and near-linear performance enhancement along with capacity.

• **Convenient and economical visual uniform management**
  The PBData Database Platform provides a uniform visual control platform SmartMon for the whole platform and global topology to conduct all-round monitoring of compute, storage, cache and network status. SQL-grade problem diagnosis such as in-depth library and instances gives the platform a high-acuity failure response capability, reducing maintenance cost by over 60%.

• **Fast service go-live**
  The PBData Database Platform, based on the converged architecture, precisely integrates such software & hardware resources as compute, storage, network and database into a dynamically scalable resource pool with high performance and openness to support rapid go-live and deployment time reduction by 65% of new service systems.

**Conclusion**

The PBData Database Platform provides cloudization construction for the small and medium-sized cities with a reliable solution “Cloud in A Box appliance + open hardware + support universal database”. The solution integrates numerous system data and creates library for them to achieve basic data security, great efficiency enhancement and effective execution of cloud-enabled management & services for those cities. Relying on the robust kernel of the new generation of Intel® Xeon™ Processor E5 v4 product family and high reliability of Intel® SSD S3510 series, PBData Database Platform speeds up execution of information system programs, significantly improves system performance, overcomes bottlenecks of the traditional "centralized + closed" SAN architecture and RISC server CPU computing power, and lowers TCO of information system construction, thus paving a new way for the information system cloudization construction for small and medium-sized cities.

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**Solution Provider:**

[Phegda Logo] [Intel Logo]

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