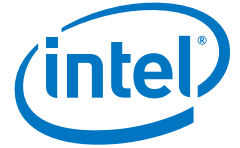


## SOLUTION BRIEF

### Intel® Xeon® Processor E5-2600 v2 Product Family

Big Data Analytics  
Cloud Computing  
Internet of Things  
Transportation



# Bringing an intelligent, future-ready transportation system

TransWiseway uses the Intel® Xeon® processor E5-2600 v2 product family to enhance big data processing and real-time computing performance of its transportation information system



"TransWiseway and Intel have had close technical cooperation to enable an intelligent transportation information platform powered by the Intel® Xeon® processor E5-2600 v2 product family, which not only enhanced big data processing and real-time computing performance, but also prepared TransWiseway technologically for the rapid demands of China's growing transportation informatization needs."

Zhang Hegao  
Vice President, Research Institute  
TransWiseway

Beijing TransWiseway Information Technology Co.Ltd. (TransWiseway) is committed to becoming a nationwide, comprehensive transportation information service provider engaged in technology research and development and providing solutions, operation services, and related value-added services. Providing comprehensive solutions and location-based information operation services, TransWiseway aims to bring a nationwide operation service system that integrates vehicle dynamics monitoring, intelligent navigation, data acquisition, and comprehensive information issuance, among other services.

## CHALLENGES

- **Improve data processing performance and capability.** Shift from a traditional operation support system to a new platform to deal with the rapid increase in the number of access points of the amount of data collected for the Internet of vehicles system and new demands for data analytics.
- **Address data security demands.** Ensure that the Internet of vehicles platform conforms with legal requirements for data and identity security protection

## SOLUTION

- **Build a new generation of intelligent transportation information platform with big data solution running on Intel® architecture.** Deploy a new Internet of vehicles system powered by the Intel® Xeon® processor E5-2600 v2 product family to deal with the ever-growing masses of data and improve the platform's data processing capability.

## IMPACT

- **Enhanced the development of intelligent transportation and Internet of vehicles system.** The new system, based on big data processing and cloud computing, can scale to meet increasing demand for traffic management data processing and creates new business opportunities for TransWiseway.
- **Improved service quality.** Enhanced computing capability and the efficiency of the transportation information system enable higher-quality products and services for the traffic/transport community including transport enterprises, drivers, and vehicle owners.

Increasingly busy traffic and the ever-changing trends in transportation information systems have taken their toll on TransWiseway's existing transportation information system. To ensure its nationwide Internet of vehicles system can bear this growing pressure, TransWiseway must plan to collect the millions of vehicles on China's roads every day while ensuring its transportation information system is available 24/7 to serve the needs of its users.

Statistical data showed that a system built for a million vehicles would produce approximately 100TB of data in half a year. "Our traditional architecture couldn't keep up with the rapid development of the Internet of vehicles system in terms of concurrent processing capability,

data processing scale, real-time data presentation, and cost," explained Zhang Hegao, vice president of the Research Institute at TransWiseway. "The limitations encouraged us to seek a new generation of transportation information platform."

As the mobile terminals collect location and other information about tracked vehicles, the data is stored and processed at the Internet of vehicle system and then used for data analysis. However, the traditional relational database-based architecture has been unable to meet the increasing data volume and demand for data processing. As mobile communication, Internet of things (IoT), and cloud computing technologies mature, they become a good foundation for a next-generation intelligent transportation information system.



# An intelligent and versatile Internet of vehicles platform based on Intel® Xeon® processor E5-2600 v2 product family allows TransWiseway to cost-effectively meet the increasing demand for vehicle data processing

## Deploying a big data-based platform for Internet of vehicles system

To overcome the limitations of the traditional architecture, TransWiseway needed to build a new-generation data processing platform with a high-performance and cost-effective architecture. Using technologies like big data and cloud computing, this new platform integrates human, road, vehicle, and cargo data to enable the Internet of vehicles system to provide transportation and supporting services, carry out innovation in logistics and insurance, and establish industry technical standards. With the new platform, TransWiseway is committed to improving its processing performance and data access capability for its customers.

The new Internet of vehicles system requires high-performance data processing capability to acquire, store, and process the data collected from the large number of end points. After comparing a series of technical solutions, TransWiseway chose to servers based on the Intel Xeon processor E5-2600 V2 product family to build the new system.

"The Intel Xeon processor E5-2600 v2 product family, with up to 12 computing cores and a tri-level cache of 30MB, provides the high processing performance the new system needs. In addition, the newly added Intel® Advanced Vector Extensions 2 (Intel® AVX2) brings sufficient improvement in floating point performance," shared Zhang.

When each vehicle uploads a piece of data for every 30 seconds, 27,000 pieces of data are uploaded per second on the system designed to serve half a million vehicles. On special occasions such as the Spring Festival, the number of active vehicles caused a data explosion the old

system was unable to handle. With the new system's powerful processing capability, TransWiseway found it could handle this massive data explosion.

The other reason for TransWiseway in choosing Intel Xeon processor E5-2600 v2 product family-based servers is the PCI Express\* 3.0 (PCIe\* 3.0) interface, which increases data throughput up to 2x<sup>1,2,4</sup>. The new system needs to process data up to the petabyte level. TransWiseway conducted I/O tests for different big data storage and cache demands and found that the new systems were able to meet those requirements.

## Enhancing security while lowering total cost of ownership (TCO) in transportation information delivery

Energy efficiency was another important consideration for TransWiseway, since it needed to lower the TCO of the new system. Using the 22nm and 3-D tri-gate manufacturing technique, servers based on Intel Xeon processor E5-2600 v2 product family provided up to 45 percent energy efficiency compared with previous-generation Intel Xeon processor-based server<sup>1,3</sup>. Its energy-efficient performance helps lowering the energy consumption at TransWiseway's data centers.

## Eying a more intelligent transportation information platform

In the future, TransWiseway will continue to collaborate with Intel in developing its transportation information system. It will incorporate Intel's technologies in IoT, data center, cloud computing big data, and information security to build more intelligent systems and innovative services for the transportation industry. TransWiseway wants to promote the development of the

## LESSONS LEARNED

- Internet of vehicles consists of information on vehicle location, speed, route, etc. Through devices such as GPS, RFID, sensors, cameras, and image processing equipment, vehicles can acquire information about their own environment and status. Through Internet technology, all vehicles can transmit their own information to the CPU, where the large amount of vehicle information can be analyzed and processed to calculate the best routes for different vehicles, report road conditions, and arrange the cycle of signal lamps.
- The Internet of vehicles industry covers automobile manufacturers, chip manufacturers, software suppliers, solution providers, network suppliers, and service providers.
- China's Internet of vehicles industry is expected to reach 10,000 billion vehicles over the next five years.
- The Internet of vehicles system is expected to have a remarkable impact on transportation management of crowded roads and highways, while improving road safety.

Internet of vehicles industry in China and introduce a new chapter in transportation information development for the industry value chain.

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<sup>2</sup> Results have been estimated based on internal Intel analysis and are provided for informational purposes only. Any difference in system hardware or software design or configuration may affect actual performance.

<sup>3</sup> 'Previous Generation' baseline configuration and SPECpower\_ssj2008 benchmark score: Platform with two Intel® Xeon® processors E5-2660, 16 GB memory, Microsoft Windows® Server 2008 Enterprise x64 Edition. Source as of November 2012. Score: 5,544 overall ssj\_ops/watt. 'New Generation' new configuration and SPECpower\_ssj2008 benchmark score: Fujitsu PRIMERGY RX300 S8\* platform with two Intel Xeon processors E5-2660 v2, 48 GB, Microsoft Windows Server 2012 Standard Edition. Source: Submitted to SPEC for review/publication as of Sept. 10, 2013. Score: 8,097 overall ssj\_ops/watt.

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<sup>4</sup> 8 GT/s and 128b/130b encoding in PCIe\* 3.0 specification enables double the interconnect bandwidth over the PCIe 2.0 specification. Source: [http://www.pcisig.com/news\\_room/November\\_18\\_2010\\_Press\\_Release/](http://www.pcisig.com/news_room/November_18_2010_Press_Release/).

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