

Intel® Xeon® processor enables intelligent traffic management

Using Intel technology, InitDream's DataExpress* enjoys highly efficient and reliable processing and analysis capabilities



"The intelligent traffic solutions, based on the integration of Internet of Things, cloud storage, and geographic information system (GIS) technology, has for the first time fulfilled dynamic, intensive, automatic, and intelligent traffic management. Our DataExpress products play an important role in this solution; and Intel, as the world's No.1 chip manufacturer, gives our products strong support to enhance processing performance and accessibility."

Zhang Yanzhao
Chief Engineer
InitDream

Founded in September 2009, InitDream specializes in the production, research and development, and promotion of cluster cloud storage. Based on these pillars, InitDream has successfully evolved into a modern, high-tech enterprise, offering cloud-related products such as cloud-based Aio*. Through the years, InitDream's expertise in distributed storage technology became known in China and even across the globe, having introduced ground-breaking innovations such as dual-cluster storage system architecture with metadata node clusters and data node clusters operating separately. In recent years, the company has provided excellent products and solutions for customers from a wide range of industries, and has made a name for itself in its field.

CHALLENGE

- **Congested urban traffic.** The city development is under pressure due to heavy traffic, which in turn severely hampers the city's development. More capable traffic management solutions are needed to solve the problem.
- **IT systems lagging behind.** Although existing IT systems have made traffic management in the city more convenient, they have been unable to solve the fundamental problem of easing heavy traffic, so a more advanced information solution is needed.
- **Insufficient computing capacity.** Modern traffic monitoring sensors are continuously generating a large amount of data. InitDream needs to build a traffic management system which can process that data efficiently and stably.

SOLUTIONS

- **Adopting Intel® Xeon® processor E5 product family into InitDream's DataExpress product.** InitDream employs Intel technology to construct its DataExpress and offer solid support in terms of mass data concurrent processing and storage as well as node-level redundancy reliability.

IMPACT

- **Efficient mass data processing and storage.** The I/O performance of all the nodes can be aggregated, making it possible to transfer, store, process and present massive data. Consequently, it allows comprehensive monitoring and display of traffic management information.
- **Node-level redundancy reliability.** The node-level redundancy technology guarantees long-term protection of environmental data, reducing the risk of data loss. The data slicing technology allows the data to be distributed rapidly; plus, the exclusive cloud disaster recovery technology ensures the integrity and recoverability of the user's data and system.

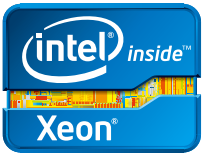
The daily commute has become a great concern for most city residents. Improved living standards have led to more vehicle ownership, resulting in heavier traffic. These factors pose severe challenges to further city development.

For many citizens, information-based solutions are the panacea for all traffic problems. However, some others don't believe so. In their opinion, information technology has already been in the daily city management. The website, database, and online workflows have helped with the city traffic management. However, that is far from enough.

How can information-based solutions contribute to better traffic control? Engineer Zhang Yanzhao of InitDream said, "To address traffic management problems effectively, it is crucial to collect, store, analyze, and share traffic information efficiently and make decisions quickly." This way of thinking is consistent with the intelligent traffic solution Intel has initiated. Now, with the strong support of Intel technology, InitDream launched DataExpress to relieve the city's traffic problem and contribute to the intelligent transportation system.

A high-speed and dynamic system

"The data collected for city traffic management is not limited to one or two types. In an intelligent traffic management solution, many different types of data are collected. Therefore, the amount of data will be extremely large," said Engineer Zhang Yanzhao of InitDream. Considering a traffic monitoring system with



The integration of Intel® architecture into InitDream's DataExpress helps governments effectively manage challenges resulting from huge traffic volumes

550 monitors, the volume of data collected daily during real-time monitoring stands at about 30TB. The demand for transmission bandwidth, processing power and stability of the system is very high.

To process such massive data with high speed, InitDream chooses Intel Xeon processor E5-2600 to be the processing core of its DataExpress. The Intel Xeon processor E5 product family uses Intel® Integrated I/O and Intel® Direct Data I/O to effectively deal with the doubling data growth. At the same time, The Intel Xeon processor E5 product family has in the microprocessor an integrated I/O controller that can support the PCI Express* 3.0 standard. This brings InitDream DataExpress stronger storage and computing capacity, reduces latency and improves throughput, thus improving the overall storage capacity of the DataExpress system. In addition, to ensure the instant presentation of massive data, DataExpress can also aggregate the I/O performance of all nodes. Each node's network and disk performance can be aggregated. In addition, performance of all nodes can be aggregated to meet the requirements of high concurrence and high I/O demands. In addition, the introduction of the scale-out elastic expansion technology guarantees free scalability between the DataExpress and the storage nodes.

A safe and reliable system

Since massive data is the core of intelligent transportation solutions, data security and reliability are key factors to measure the capability of a traffic management system. In the intelligent traffic solution, mass data will be quickly collected through an Internet of Things gateway and

put into the DataExpress. In the event of data loss, the effectiveness of the entire solution will be affected. To ensure the safe and reliable processing of the data, DataExpress needs to conduct high-speed backup and rapidly distribute the data to storage nodes.

InitDream chose the Intel Xeon processor E5 product family for its powerful processing capabilities. The Intel Xeon processor E5 product family includes up to eight cores and can support system storage of up to 768GB. It also supports Intel® Advanced Vector Extensions (Intel® AVX), which can provide up to 2x and higher performance gains for floating point operations¹. Since DataExpress storage data needs CPU computing for the slicing AVX's high-efficiency instruction encoding modes can effectively shorten the time for the data slicing, and improve the storage performance of DataExpress. Plus, performance enhancing technologies such as Intel® Turbo-Boost Technology 2.0, Intel® Hyper-Threading Technology, and Intel® Virtualization Technology are all built into the Intel Xeon processor E5 product family.

With the Intel Xeon processor E5 product family, DataExpress uses node-level safety technology (node redundancy protection mechanism) to improve safety. The node safety mechanism can shut down different nodes. Based on the safety mechanism, 50 to 75 percent of nodes can be shut down, and N+1 mode can also be used to improve the utilization up to 85 percent. DataExpress uses three data distribution strategies. Coarse replication, a technology

DataExpress

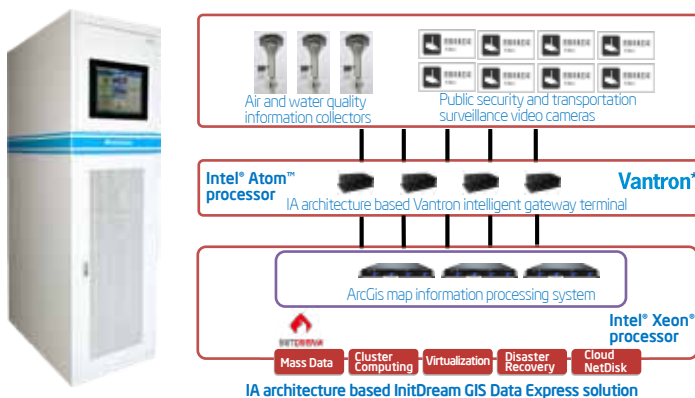
In InitDream's all-in-one design, servers, exchanges, storage products, software products and various application systems are integrated into one plug-and-play cabinet, to construct a solid cloud computing platform. Such design simplifies the deployment and management of cloud computing platform, and offers an innovative integrated cloud computing node solution to the marketplace.

- High speed. InitDream's expertise in cloud and cluster storage ensure the high performance of each DataExpress node.
- Safety. The full integration of the data security technology such as data encryption, data recovery, and access authentication addresses stringent security requirements of customers.
- Convenience. Features such as simple operation, plug-and-play and on-demand scalability make DataExpress suitable for various data types and complex virtual environments.

similar to Hadoop*, slices the data to 64MB and then generates corresponding duplicates according to the duplicate mechanism (RepNum). It also distributes and stores the data in the back-end storage nodes. Strip plus replication technology distributes and stores the data in all the disks under the span storage device. At the same time, it generates RepNum-1 duplicates. Finally, InitRAID is a technology similar to RAID5 and developed by InitDream. InitRAID is a software based technology that turns the a group of server nodes into a redundant array. With up to half of the DataExpress nodes are destroyed, the data services will not be lost. In remote disaster recovery, InitDream technology can offer remote duplicate function across multiple data centers, which can realize configurable data synchronization among multiple data centers.

With this close collaboration with Intel, InitDream's DataExpress has played a key role in creating an intelligent traffic management solution. InitDream has made outstanding achievements in high-speed data processing and safety, thus contributing to the city's urban development.

Find a solution that's right for your organization. Contact your Intel representative, visit Intel's Business Success Stories for IT Managers (www.intel.com/itcasestudies) or explore the Intel.com IT Center (www.intel.com/itcenter).



The city's traffic management solution powered by InitDream's DataExpress

¹Performance comparison using Linpack benchmark. Baseline score of 159.4 based on Intel internal measurements as of 5 December 2011 using a Supremicro* X8DTN+ system with two Intel® Xeon® processor X5690, Turbo Enabled, EIST Enabled, Hyper-Threading Enabled, 48GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_64. New score of 347.7 based on Intel internal measurements using an Intel® Rose City platform with two Intel® Xeon® processor E5-2690, Turbo Enabled or Disabled, EIST Enabled, Hyper-Threading Enabled, 64GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_64.

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