Hejian Technology Co., Ltd.

A state-of-the-art semiconductor fab keeps production-related systems up and running with the Stratus® everRun® downtime prevention solution

Hejian Technology (Suzhou) Co., Ltd., a world-class wafer manufacturing business located in the Suzhou Industrial Park, employs more than 2,000 people, has a maximum output capacity of 80,000 wafers, and supports process geometries ranging from 0.5 micron to 110 nanometer. The company provides a full range of services—design, mask making, wafer fabrication, testing, and packaging—for consumer, automotive, industrial, and other applications. Hejian is committed to providing comprehensive and competitive services for new product development, delivery cycle time, and yield enhancement to meet evolving customer requirements in rapidly growing markets.

The challenge
Integrated circuit (IC) manufacturing is a key industry in China with strong growth momentum and high demand for production capacity. However, IC fabrication is a capital-intensive business with extremely high start-up costs. Since fabs depreciate at such a rapid rate, it’s critical to keep production lines running at full capacity 24/7/365. If a fab’s production system goes down due to hardware failure, the company can sustain uncountable financial losses.

Hejian uses an automated guided vehicle control (AGVC) system to manage the movement of robots through a high-accuracy navigation route within its state-of-the-art fab. These robots transport wafer carriers between process tools and handling tasks without manual intervention for improved efficiency and reduced risk of contamination. If the AGVC system experiences downtime, production screeches to a halt. Costly equipment sits idle, yield is reduced, and customer shipments are delayed. As a result, every minute of downtime not only eats into profits, but it can also damage the company’s customer relationships and business reputation.

Given the high cost of IC manufacturing, Hejian decided its traditional high availability (HA) architecture, which consisted of clustered servers with failover capabilities, provided insufficient protection against downtime. If the main server encountered a problem, the fab was at risk of downtime and data loss when switching to the backup server. With the stakes so high, Hejian decided to implement a highly versatile continuous availability solution to protect its virtualized workloads and data against costly downtime.
The solution
In July 2018, after conducting an extensive evaluation process, Hejian implemented Stratus® everRun® Enterprise on two Hewlett Packard DL 380 Gen 9 servers to achieve continuous availability of its business-critical AGVC applications. everRun delivers software-based fault tolerance by linking the two servers together via a virtualization platform that pairs protected virtual machines to create a single operating environment.

Because everRun replicates the entire application environment, including data in memory, AGVC applications are being processed in parallel on both servers to eliminate risk of system interruption or data loss. Software-based checkpointing and statepointing protect both replicated and in-flight data. If a hardware component fails, everRun simply substitutes the healthy component from the second server until the failed component is repaired or replaced. As a result, the fab's AGVC system continues to operate uninterrupted for always-on chip manufacturing.

The results
With everRun, Hejian is able to realize the value of continuously available AGVC applications without the configuration complexities—modifying applications to make them HA aware, managing connectivity between servers, and more—associated with its traditional HA cluster.

everRun's integrated virtualization platform enables consolidation of physical servers and lowers operating costs while constant replication proactively prevents downtime. Built-in virtualization also reduces total cost of ownership through lower energy consumption, improved infrastructure utilization, and more flexible use of computing resources. Most important, everRun delivers the data stability and application availability required to keep production lines operating at full capacity 24/7/365 for increased profitability.

For added convenience, a comprehensive availability console makes it easy to set up, configure and manage the entire everRun environment from a single web-based interface. In addition, remote availability services monitor the everRun environment and alert IT staff of any issues—freeing them to focus on other priorities.

“A highly efficient production capacity with the latest processing technologies is critical to success in the IC industry, where profit margins are razor thin. Stratus® everRun® Enterprise, combined with industry standard x86 systems, quickly and easily protects our virtualized applications and data against unplanned downtime. This flexible software-based solution delivers the continuous AGVC application availability we need to operate at full production capability 24/7/365.”

Joe King Hejian Technology Co., Ltd.