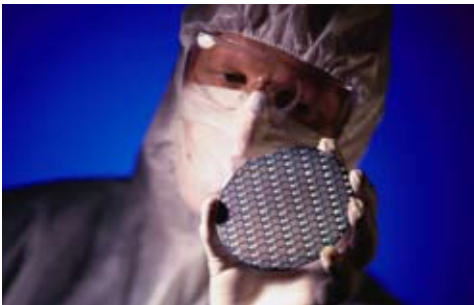




## COMPELLENT HELPS RUDOLPH TECHNOLOGIES REMOVE THE “WIDTH” FROM BANDWIDTH



Electronics customers continue to demand more advanced, feature-rich products at lower prices. Rudolph Technologies helps semiconductor chip makers meet customer demands, achieve their cost targets and meet production goals with a suite of high-speed inspection and metrology solutions vital to the manufacturing process.

Rudolph’s wafer inspection equipment—a complex system that includes high-speed robotics, advanced optics and unique software—capture digital images of each die (a small piece of a silicon wafer that contains the complete device being manufactured) as it moves through the manufacturing process.

The rapid pace of the electronics industry has fueled high-speed growth for Rudolph Technologies. When a recent merger multiplied that growth, the resulting explosion in imaging data made it clear that the company’s direct-attached storage infrastructure was no longer adequate.

“Our inspection work means we store a huge number of large digital images,” says Peter Fitch, IT strategic planning and infrastructure manager at Rudolph Technologies. “Moving 100 of those large images per second into storage can fill up a volume very quickly. We were spending far too much time provisioning new storage and expanding volumes.”

Every time they added a volume, the team was forced to start from scratch. “We had to back up all of the data to tape. Then we would install the new hard drives, create the new volume and restore all of the data from tape,” says Fitch. “The process was too cumbersome given our exponential growth.”

Like many rapidly growing companies, Rudolph Technologies’ disaster recovery plan lagged behind due to cost constraints associated with the bandwidth and storage requirements. The IT team had delayed implementing remote replication, because the cost of a sufficiently large data pipe seemed prohibitive.

Fitch’s team investigated several solutions for centralized storage management and recovery, ultimately selecting the Compellent® storage area network (SAN) for a modular solution that would give Rudolph Technologies the flexibility to grow at the speed of business. The team implemented a Compellent SAN to automate time-intensive management activities and affordably increase storage availability.

## RUDOLPH TECHNOLOGIES

“I recovered a directory for one of our offices a few days ago, and it only took me three minutes. I simply rolled back to a snapshot using Compellent’s Data Instant Replay.”

PETER FITCH  
IT Strategic Planning and  
Infrastructure Manager  
Rudolph Technologies

## RESULTS REPORTED BY RUDOLPH TECHNOLOGIES

- » Modular, flexible architecture allows the IT team to build gradually on existing technology
- » Thin Provisioning enables new storage volumes to be created in minutes instead of hours
- » Space-efficient Replays reduce monthly bandwidth costs from \$15,000 to \$600
- » Data Progression saves time and money by automatically moving 80 percent of data to Tier 2
- » Accurate information and optimization reduce bandwidth requirements by more than 62 percent each month

## OPERATING SYSTEMS

- » Microsoft® Windows Server® 2003
- » Microsoft Windows® Storage Server 2003 R2
- » Microsoft Windows Server 2008

## KEY APPLICATIONS

- » Microsoft SQL Server®
- » File Servers
- » Riverbed Steelhead

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## COPILLOT SERVICES

Compellent's Copilot Services provide a technical support lifeline for customers at any time of day or night—tracking incidents online, alerting system administrators and providing valuable insights and potential solutions. IT team members at Rudolph Technologies are passionate about technology and committed to their jobs, and recognize the same attributes in the engineers at Copilot Services.

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“The Copilot engineers sometimes call me up proactively with suggestions for doing things a little more efficiently or fine-tuning performance, even though we haven't seen a problem. I really appreciate that. They have a dedication to the customer that is very refreshing in this day and age.”

PETER FITCH  
IT Strategic Planning and  
Infrastructure Manager  
Rudolph Technologies

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## MODULAR DESIGN AND THIN PROVISIONING PROVIDE THE FLEXIBILITY TO GROW

Compellent's modular hardware and flexible architecture enables Rudolph Technologies to scale its storage without forcing difficult technology choices or having to purchase more storage than necessary in advance. Compellent's highly scalable system can allow Fitch and his team to grow from one to hundreds of terabytes all without the need for a forklift upgrade.

“Some hardware vendors would have required us to replace an entire controller to expand capacity,” says Fitch. “With Compellent, we can simply integrate new technologies without discarding what we have.”

Now that the Compellent SAN is in place, the team can quickly adapt to user requests for additional storage. “We're able to provision a server in just a few minutes using boot images stored on the SAN,” says Fitch. “In addition, we no longer have to spend hours backing up and restoring from tape to expand our existing volumes.”

Once a new volume is created, the IT team is able to use it much more efficiently. Compellent's Thin Provisioning, called Dynamic Capacity™, provides the highest storage utilization possible by eliminating allocated but unused capacity. Dynamic Capacity enables Rudolph Technologies to provision volumes large enough to accommodate the growing number of digital images, yet only consume physical capacity when the data is actually written.

The new SAN includes Compellent's Enterprise Manager software, which simplifies analysis of usage data so that the IT team can better predict future needs. Enterprise Manager's reports provide real-time, accurate information that allow Fitch and his team to be more strategic about their storage decisions.

“Planning for growth is much easier and more accurate with the trending capabilities built into the Compellent solution,” says Fitch. “We can plan our purchasing to meet actual demand instead of over-purchasing based on guesswork.”

## THIN REPLICATION OFFERS DATA RECOVERY SAVINGS

Compellent's Data Instant Replay™ and Remote Instant Replay™ have given Rudolph Technologies the snapshot and replication capabilities it previously lacked. Fitch and his administrators have lowered capacity, bandwidth and management costs while increasing business continuity.

Rudolph Technologies relies on Compellent's Thin Replication to deliver multi-site replication at a fraction of the cost of many other options. Fitch can create continuous snapshots (Replays) at any time interval with minimal storage capacity and no impact on performance. That's because Compellent's Remote Instant Replay software uses a very space-efficient technology that replicates changes between Replays rather than duplicating all of the data each time.

Fitch and his team have paired Compellent's robust business continuity solution with Riverbed Technology's Steelhead Appliances to implement an affordable and accelerated replication solution that is easy to use. Riverbed extends Compellent's robust disaster recovery solution by slashing the time required to replicate data and optimizing bandwidth utilization.

“We have offices around the world, so we needed a solution that would replicate data between local and remote sites,” says Fitch. “Other vendors told us that we would need a much larger data pipe costing upwards of \$15,000 a month to link our three main offices. Compellent's IP-based solution only requires a T1 line that costs us \$600 a month.”

Fitch can take advantage of that big cost savings without sacrificing performance using Compellent's bandwidth simulation and shaping features with Riverbed's bandwidth optimization and disaster recovery acceleration. The combination allows Rudolph Technologies to estimate bandwidth purchases based on actual data and customize transfer rates based on link speed, time of day and replication priority. As a result of this accurate information and optimization, Rudolph Technologies has been able to reduce its replication bandwidth requirements by more than 62 percent each month.

## EASE OF USE AND AUTOMATED TIERED STORAGE SAVE STAFF TIME

The ease of use of the Compellent SAN saves administrative time and expense for the IT team. Even advanced storage features, such as Automated Tiered Storage and Thin Replication, can be accomplished by most administrators in less than 10 minutes. That ease of use translates into savings on staff training and time-consuming, repetitive storage monitoring and capacity planning tasks.

"I could teach someone who is not familiar with storage area networks how to administer the Compellent SAN in 15 minutes," says Fitch. "We definitely did not need to consider hiring a storage expert, as some other vendors recommended."

One of the most effective time-saving features of the new SAN is Compellent's Data Progression™, which dynamically classifies and moves data at the block-level between tiers of storage based on frequency of access. With Automated Tiered Storage, Fitch and his team can take advantage of the significant cost savings of spreading the company's data across two tiers of storage without the time-consuming data classification and the repetitive manual data transfers.

Rudolph Technologies uses two storage tiers, one with high-speed Fibre Channel drives and a second with higher-capacity SATA drives. "Once we implemented Data Progression, we were able to see that 80 percent of the data on our first tier didn't need to be there because it wasn't accessed very often," says Fitch. "Now we save time and money by automatically storing inactive data on lower-cost SATA drives."

With the Compellent SAN, Rudolph Technologies is well prepared for continued growth. "There is no question that the flexibility, ease of use and cost-efficiency of the Compellent solution is helping us avoid storage growing pains," says Fitch. "Just as important, the time saved by the IT team can be reinvested in planning future strategic projects."

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