



## Storage With a Smile

**Align Technology, maker of innovative orthodontic products, faced business-critical and rapidly growing data storage needs. A Storage Area Network (SAN) from Open Systems Solutions, Inc. (OSSI) was just what the doctor ordered.**

**Challenge:** Design and implement a data storage and backup system that allows for rapid and cost-effective expansion and growth.

**Solution:** A Storage Area Network from OSSI that combines hardware, software, network infrastructure and support.

**Benefits:** Cost-effective data storage today, plus scalability for rapid expansion, along with high-speed backup for disaster protection.

Introducing a hot new product and gearing up for rapid growth are nice problems to have. But that doesn't make them any less challenging, particularly when developing a strategy for business-critical data storage.

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**Andrey Abramov  
Align Technology**

Align Technology Inc., based in Santa Clara, Calif., burst on the scene a few years ago with a new generation of high-tech orthodontic products. The company's core offering, the Invisalign System, uses 3-D computer graphics technology to design and manufacture customized orthodontic aligners. Developed as an alternative to conventional wire braces, the Invisalign aligners are attractive and easy to use.

Because the company's flagship product is built around leading-edge technology and data-intensive 3-D graphics, a robust data storage and backup system are paramount. "Data is the most valuable asset of this company," says Andrey Abramov, CIO for Align Technology. "In the event of a disaster, we can always buy new manufacturing equipment. But the data on our customers and the experience accumulated through treating them – that can't be recreated quickly. We cannot under any circumstances lose our data."

That's why Align Technology turned to a data storage specialist firm, Open Systems Solutions, Inc. (OSSI). OSSI helped the company design and implement the right combination of hardware, software and network infrastructure to meet its data storage and backup requirements – and help ensure its ongoing success.

### *Rigorous Requirements*

The Invisalign System uses a series of clear, removable aligners to straighten teeth. The treatment is becoming increasingly popular, with more than 90 percent of U.S. orthodontists certified to treat patients with Invisalign.

The process begins with the orthodontist taking impressions of a patient's teeth. The impressions are sent to Align Technology, which uses them to make a plaster mold. Using advanced imaging technology; Invisalign transforms the plaster mold into a highly accurate 3-D digital image. The company also makes an animated file, called ClinCheck that depicts the movement of the patient's teeth from beginning to final position. The orthodontist reviews ClinCheck over the Internet, and specifies adjustments as necessary. Once the ClinCheck file is approved, laser scanning creates a customized set of plastic aligners for each stage of treatment.

Patients wear each set of aligners for about two weeks, removing them to eat and brush. As they replace the aligners with the next in the series, their teeth move, little by little, until they have straightened to the final position. Treatment averages nine to 15 months and involves about 18 to 30 sets of aligners.

While the process is simple for the orthodontist and patient, it's anything but for Align Technology. The company is essentially in the business of making custom medical appliances. Because every patient's teeth are unique, no product is manufactured twice.

"There is a physical object, the plaster mold, at the beginning of the process, and a physical object, the aligners, at the end," Abramov points out. "But most of the process involves 3-D images and server farms crunching numbers. A single case can require 45MB of data. Multiply that by thousands of customers, and you can see we're talking about many terabytes of data."

What's more, the company must maintain a database of patient information. "A typical treatment can take a year or longer, and if the orthodontist wants to make changes during the course of treatment, the patient's data must be readily available," explains Abramov. "You can't just burn a CD and store it in a box somewhere."

Align Technology's storage requirements were clear. First, it needed robust storage hardware that could handle large quantities of data. Second, it required a solution that could grow rapidly – and cost-effectively – with its needs. Finally, the company wanted a high-performance archival system that could quickly back up data for disaster protection and long-term retention of customer information.

## *A Straightforward Solution*

OSSI worked with Align Technology personnel to understand their business and data needs and recommend the most appropriate solution. The company had been considering network-attached storage (NAS), but NAS is better suited to file sharing, which wasn't a high priority for Align Technology.

OSSI recommended a Storage Area Network (SAN), a more appropriate and cost-effective alternative. The SAN provides the value, performance, reliability and scalability Align Technology needs.

At the heart of the SAN is the LSI Logic MetaStor E4400 storage array. This enterprise-class storage system provides high-speed Fibre Channel connectivity and more than 40 terabytes (TB) of scalability. Support for heterogeneous environments means Align Technology can integrate its disparate computer platforms, including Windows, UNIX, Linux and several proprietary applications.

The solution also ensures continuing data availability in the event of a hardware failure. "With our SAN architecture, the failure of any single component doesn't affect our business," says Abramov. "If a component fails, the only people who know about it are IT – the business doesn't even notice."

The company currently manages 3TB of data, which it anticipates will grow by a half-terabyte per quarter. For that reason, OSSI designed the solution so capacity can be added on-the-fly as needs warrant – an approach that reduces costs in the long run.

The solution was driven by the company's business needs. "We store all our cases under the same version control system, and the best way to store that data is on one giant, virtual disk," says Abramov. "Our SAN allows us to take lots of physical disks and put them together to create a single virtual disk that offers continuous storage space."

For backup, OSSI implemented a Qualstar TLS-88132 tape library, which is connected to the SAN through a backup server. With compressed capacity of up to 26TB and a compressed data rate of 864GB per hour, the library is ideal for Align Technology's needs. Syncsort Backup Express software provides centralized control of backup and restore functions, plus a distributed architecture to optimize network usage.

"We had very demanding requirements for backup," notes Abramov. "We wanted to be able to back up all data on all systems – including the 3TB SAN – in less than 24 hours. So it wasn't just a matter of how much we could store, but how quickly we could store it." The Qualstar tape library and Syncsort backup software allow the company to handle backups in 17 hours, without going offline.

## *Ear-to-Ear Value*

Just as important as the hardware and software was OSSI's consultative approach, reports Abramov. "OSSI worked with us when other vendors didn't," he says. "They helped us analyze and understand our requirements for both today and tomorrow."

It's a methodology Abramov recommends. "Most companies try to fit the product to the needs of the business," he points out. "We first identified our requirements and then worked to find the right vendor to meet those requirements."

Abramov also offers this advice to organizations evaluating a storage solution: "Expect that everything that can break will break, and develop your storage architecture around that expectation. But most important, test the competency of your vendor, because the worst thing is to go with an incompetent partner. You will be paying for it forever."

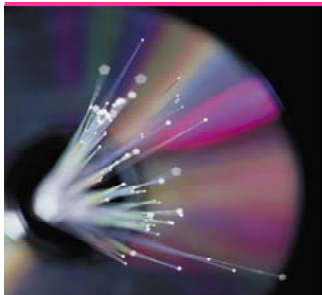
That, concludes Abramov, is why Align Technology chose OSSI. "OSSI has been spectacular at understanding and responding to our needs," he says. "If I already knew what I needed, I could have bought it on eBay. The value OSSI brings is their expertise. They continue to work with us to ensure we have the best solution."

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