

# NASA World Wind

A breakthrough way to look at our world.



## Applications

Primary storage for high resolution 3D satellite imagery processing services used by NASA and its World Wind project.

## Challenge

Traditional storage systems limited the processing of applications and added unwanted complexity to the image processing workflow, ultimately making it difficult for NASA World Wind to efficiently access Landsat 7 satellite data and slowing the availability of processed imagery to users.

## Isilon IQ Benefits

NASA evaluated Isilon IQ along with traditional storage systems and selected Isilon IQ for its:

- Ability to sustain extremely high throughput and I/O
- Linearly scalable performance and capacity
- Support for up to 5.2 petabytes in a single file system
- High-performance and concurrent access for geoprocessing applications, and fast online delivery of processed imagery

## Isilon Systems Scale-out NAS Powers Geoprocessing Applications to Deliver Breakthrough Satellite Imagery Online for NASA World Wind

By using a vast collection of processed high resolution satellite imagery, NASA World Wind, an open source, virtual globe enables anyone with Internet access to experience and explore the Earth (along with the Milky Way, Mars, Jupiter and Venus) and its terrain through visually rich 3D imagery.

Leveraging processed Landsat 7 satellite imagery and Shuttle Radar Topography Mission (SRTM) data, NASA World Wind enables users to zoom from satellite altitude to any place on Earth, delivering an eye-level, 3D view of the surface. It's similar to Google Earth—but with more scientific data.

To achieve this compelling user experience, i-cubed, a leader in value-added imagery aggregation and managed dissemination technologies, performed the complex processing required to convert raw satellite data into rich, high resolution imagery of the Earth's terrain. The data is then used by NASA World Wind for integration into their Microsoft .NET-based application for staging and online delivery.

Using Isilon IQ scale-out NAS, powered by the fifth generation of Isilon's OneFS® operating system software, more than 8,000 large Landsat 7 satellite images have been consolidated into a single volume and single file system while providing high-performance and concurrent access to i-cubed geoprocessing applications.

## Other-Worldly Performance for Processing Over 8,000 High Resolution Satellite Images

Prior to adopting Isilon IQ, i-cubed's traditional storage system limited their processing applications and added unwanted complexity to the image processing workflow, ultimately making it difficult for World Wind to efficiently access the Landsat 7 data and slowing the availability of high resolution, processed imagery to users.

*"The Isilon IQ scale-out NAS used to store and deliver NASA World Wind data has very effectively met our needs for critical data storage and high bandwidth delivery."*

*—Patrick Hogan, Project Manager, NASA World Wind*

“We had a lot of data to process—over 8,000 images total, each running about 800 MB in size—that we had to ‘mosaic’ together and balance, about 6.5 terabytes of total data,” said Jason Woodworth, Principal Imagery Analyst for the World Wind project. “This critical data not only needed to be stored in a single location, but made quickly available on demand to our engineers. In short, for the World Wind project, we needed the highest performing storage solution we could find.”

Isilon IQ combines Isilon’s OneFS® operating system software with best-of-breed, industry-standard hardware to create a single file system that delivers unsurpassed reliability, scalability, performance and value. Isilon IQ is the first clustered storage system that can be seamlessly grown from 4 terabytes to 5.2 petabytes in a single file system and can scale up to 45 GB/second of throughput—something that i-cubed definitely put to the test during the World Wind project.

The data-intensive nature of the satellite imagery, coupled with the throughput demands of parallel processing across more than 60 CPU’s, required the type of performance and scalability that only Isilon IQ could provide.

“When we’re talking about Isilon IQ performance, we’re talking about its ability to handle multiple processors hitting the cluster all at once— and not have Isilon IQ be a bottleneck in running 6.5 terabytes of data through it over the period of time that it took to complete the World Wind project,” said Woodworth. “The Isilon IQ system was definitely not a bottleneck.”

“To ensure that our online user’s experience is seamless and compelling, we require storage that delivers high concurrent performance for processing the raw satellite data, as well as immediate, reliable access for fast online delivery,” said Patrick Hogan, Project Manager for NASA World Wind. “The Isilon systems are working very well for us.”

### Meeting The Demands of Increasingly Growing Datasets

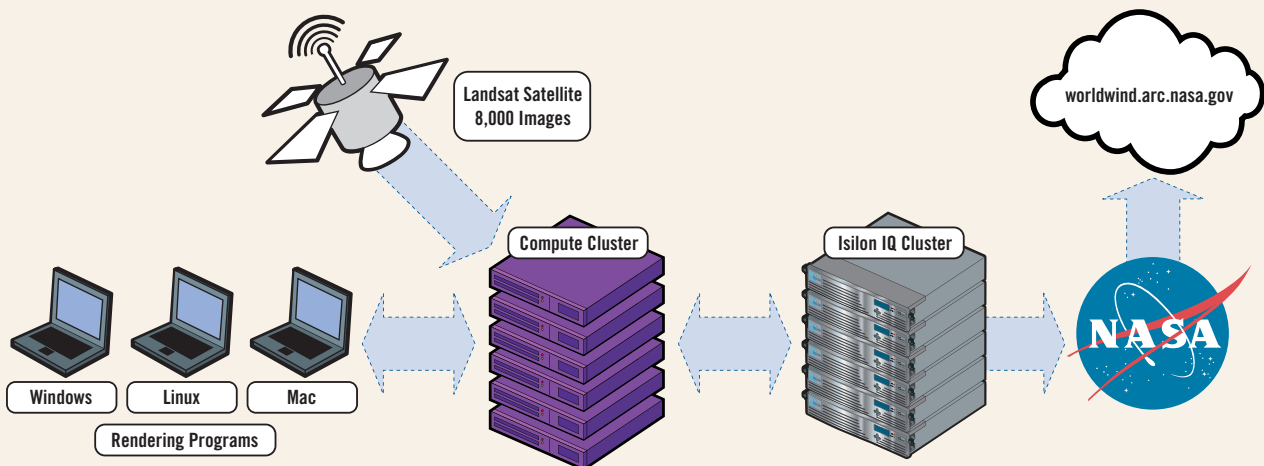
As for the future, i-cubed, NASA, and Isilon are ready for the next generation of more detailed imagery and finer resolutions which essentially equate to a ‘high definition’ quality for satellite imagery. More sophisticated satellites, aerial collection devices and cameras are currently collecting data in higher and finer resolutions than ever before, with images taken closer to the ground so users can see even more detail.

And, according Holbrook, these newer resolutions represent a geometric progression in size: moving from what’s called a 1-foot (12-inch) resolution to a more detailed 6-inch resolution increases files sizes by a factor of four, not two.

“Everybody wants higher resolution and more detail,” said Holbrook. “For us, that means we need high performance, highly scalable storage in order to manage our future projects. We firmly believe Isilon IQ will stand up to any type and size of data we throw at it, and will easily adapt to these new demands.”

*“We had over 60 CPU’s constantly and simultaneously taking files off the Isilon cluster, processing them, and putting them back, nonstop for over 3 weeks. Isilon IQ...enabled us to complete the dataset and deliver it back to World Wind in record time.”*

—Doug Holbrook, Vice President of Operations, i-cubed



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