



Appistry Enterprise Application Fabric at GeoEye: Implementing a Next-Generation Platform for Geospatial Intelligence

This case study profiles Dulles, Va.-based GeoEye – the leading provider of commercial satellite imagery to the Department of Defense and intelligence community – with a focus on why GeoEye chose Appistry Enterprise Application Fabric to both reduce operational cost and complexity and enhance the company's agility in meeting the evolving needs of its customers.

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This case study profiles GeoEye – the leading provider of map-accurate commercial satellite imagery to the U.S. military and intelligence community – with a focus on why GeoEye chose Appistry Enterprise Application Fabric (Appistry EAF) to both reduce operational cost and complexity and enhance the company’s agility in meeting the evolving needs of its customers.

About GeoEye

Formed as a result of the ORBIMAGE acquisition of Space Imaging in early 2006, GeoEye is the largest satellite commercial remote sensing company in the world. With three earth imaging satellites currently in orbit, GeoEye provides low, medium and high resolution images to governmental intelligence, national security and military organizations, as well as to commercial customers. In particular, the National Geospatial-Intelligence Agency (NGA) purchases approximately \$60 million worth of images and products from GeoEye on an annual basis, and awarded GeoEye a staggering \$500 million “NextView” contract for the development of a next-generation high-resolution remote sensing satellite. This satellite, known as GeoEye-1, is set to launch from Vandenberg AFB, California in spring 2007 and will provide unprecedented levels of image resolution. From an orbit of 423 miles above Earth, GeoEye-1 will have a ground resolution of 0.41-meters, or about 16 inches. It will be the world’s highest resolution commercial earth-imaging satellite and be able to collect some 700,000 sq. km. of imagery each day in panchromatic mode. That is equivalent to an area the size of Texas.

The Challenge: Reduce Infrastructure Cost & Complexity without Sacrificing Reliability, Enhance Competitive Agility

Reducing Cost & Complexity

Geospatial intelligence applications can generally be characterized as tackling intensive computations that involve unrelenting volumes of data. GeoEye’s core,

At-A-Glance

Industry

Geospatial Intelligence

Challenge

Build a next-generation platform for image “ingest” and “exploitation” applications that is more cost-effective, easy-to-manage and flexible than traditional approaches, without sacrificing reliability.

Solution

Appistry EAF running on 50+ Linux-based commodity computers provides a self-managing and self-healing distributed computing environment that did not require custom application development and can easily scale up or down to meet business requirements.

Key Benefits

- Scalability limitations eased, enabling incremental application growth
- Application execution reliability enhanced, easing burden of relentless inflow of data
- Estimated 77% reduction in hardware and software acquisition and recurring costs
- Application developers freed to focus on algorithms rather than programming structure
- Application management simplified, decreasing operational complexity
- Application innovation unleashed from infrastructure-driven constraints

saleable asset is the imagery it gathers from the satellites it owns and operates. GeoEye takes massive amounts of raw image data from the satellites and processes it through a series of compute-intensive “ingest” applications that perform a variety of processing steps, such as image sharpening, compression and geocorrection. In order to handle increased data volume created by the launch of a higher resolution satellite and/or algorithm enhancements made to ingest applications without impacting the timely delivery of images to downstream applications, GeoEye must rely on its technology-based solutions to keep pace.

In the past GeoEye and others in its industry have lived by the motto that “big problems require big machines.” That means that GeoEye has turned to high-end multi-processor supercomputers to run its mission-critical applications.

However, this approach presents GeoEye with significant cost and complexity issues:

- *Escalating infrastructure costs:* With an initial price tag in the millions, and recurring maintenance fees in the hundreds of thousands, purchasing high-end multi-processor servers to meet increasing requirements requires enormous up-front and ongoing infrastructure investments.
- *Hardware obsolescence:* GeoEye’s applications are typically deployed longer than the hardware they are originally architected to run on, so system obsolescence—and the potential need to re-architect a deployed application when vendor support for the hardware platform ends—is a real concern.
- *Complexity and risks of application development for multi-processor environments:* Structuring applications to take advantage of symmetric multiprocessing (SMP) servers requires specialized development skills and prolonged development efforts.
- *Platform rigidity:* Expensive, high-end servers require accurate, upfront forecasting of capability and scalability needs, leaving little room for flexing to meet changing requirements as the business evolves.

“Traditional approaches to developing software applications at the scale required by our business is a growing challenge for our developers, not to mention the burden on our pocketbook of buying and operating expensive proprietary hardware...”

Enhancing Competitive Agility

In addition to the challenge of reducing the cost and complexity of running its ingest applications, GeoEye faces constant pressure to “do more.” This pressure is internally driven by the desire to differentiate itself from competitors and create new revenue streams, and is also driven by the general sense in the intelligence community that whatever is currently being done to “protect and defend” is not enough.

Once GeoEye’s images are ingested, they are “exploited” by downstream applications that turn the images into actionable information. As with improving ingest applications, the high-end server approach creates barriers to GeoEye’s ability to innovate new exploitation applications. Developers are forced to conceive of and architect applications within the constraints of the infrastructure’s limitations, stifling the company’s competitive agility.

The Solution: Appistry Enterprise Application Fabric

GeoEye selected Appistry EAF upon which to build its next-generation platform for geospatial intelligence applications. Because Appistry EAF meets the company’s requirements for reducing infrastructure cost & complexity without sacrificing reliability, while also increasing the company’s competitive agility, it will be called

upon to provide a “scale without fail” environment for new GeoEye application projects going forward. Appistry EAF will provide to GeoEye applications:

- **Application-level fault tolerance.** Fabric-based applications derive their dependability from the fabric itself, rather than from the hardware on which they run;
- **Automated management.** Application fabrics dynamically discover and assimilate new hardware and software, minimizing administrative and operational overhead; and
- **Scale-out virtualization.** Application fabrics can easily scale out across tens, hundreds, or even thousands of commodity computers, yet are viewed and managed as a single system by developers and administrators.

Key benefits of Appistry EAF for GeoEye include:

- *Effortless scaling:* Appistry EAF allows GeoEye to build out capacity based on today’s application requirements and scale the environment gradually as needed, with no architectural changes or changes to the application’s code base.
- *Enhanced reliability:* Appistry EAF insulates GeoEye’s applications from the underlying infrastructure and its frailties, ensuring that hardware failures never impact completion of in-process application tasks.
- *Reduced hardware acquisition & maintenance costs:* GeoEye estimates that a single high-resolution image processing application running on Appistry EAF will save 88% in hardware and software acquisition costs and 58% in 3-year recurring costs.
- *Greater development simplicity:* GeoEye developers can focus on honing algorithms rather than programming structure, decreasing application development time and eliminating the need for specialized development skills to deal with distributed computing concepts.
- *Elimination of hardware lock-in:* Because Appistry EAF is machine independent, GeoEye can perform rolling hardware refreshes throughout the life of a given application and thus eliminate the concern of hardware obsolescence.
- *Increased business agility:* With Appistry EAF unleashing GeoEye from infrastructure-driven constraints, the company can move more quickly to seize business opportunities while also reducing its risk.

“By relying on the application fabric to provide scalability, reliability and manageability, we can leave our infrastructure concerns behind and focus on providing maximum value to our customers.”

*Ray Helmering
Vice President
GeoEye*

GeoEye selected Appistry EAF only after a rigorous technology and architecture evaluation. A key selling point for the GeoEye team was the fact that Appistry was able to demonstrate the viability of its solution, not just talk about it. Appistry proved through an onsite feasibility study that fabric-enabling its applications would affordably provide GeoEye with the scalability, reliability and manageability capabilities it was looking for.

Looking Ahead

Appistry provides GeoEye with a “future-proof” application environment. With Appistry EAF, GeoEye can not only serve current customers better and more profitably, the company can grow its business in new directions with the only limitation being the company’s imagination about how it can exploit its core image assets. In Appistry GeoEye also has a new business partner, as the two companies work together to ensure Appistry EAF meets the needs of the most demanding geospatial intelligence applications both now and into the future.

About Appistry

Appistry is the pioneer and leading provider of application fabric software, which IT and engineering organizations use to deploy and manage demanding applications more quickly, easily and cost-effectively. Appistry provides a "real-time grid" environment for running large-scale, time-critical applications across a network of commodity-grade computers, without sacrificing dependability or manageability.

Appistry Enterprise Application Fabric

Appistry Enterprise Application Fabric (Appistry EAF) is Appistry's flagship product. Appistry EAF creates a "scale without fail" software-based environment for building scalability, dependability and manageability into the application layer, thus insulating fabric-based applications from the underlying physical infrastructure and its frailties. As a result, fabric-based applications are extremely agile, able to quickly adapt to the changing demands of the business.

Appistry EAF supports C, C++, Java and .NET programming languages such as C# and VB.NET. Microsoft Windows and Linux are supported operating systems.

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