

### ***Satellites in the clouds***

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Cloud computing has the potential to transform the enterprise IT landscape by offering a variety of benefits such as reduced capital costs, data center efficiencies, on-demand computing resources, faster and cheaper software development capabilities, and even environmental benefits. IDC, a market research firm, estimates that global IT cloud services spending will increase from \$16 billion in 2008 to \$42 billion in 2012, representing a compound annual growth rate (CAGR) of 27%.

Cloud computing is at the convergence of many technologies and concepts by combining the operational benefits of virtualization, scalability benefits of grid computing and system design benefits of service oriented architecture (SOA). As such, many companies not only view cloud computing as a useful technology, but also a potential market opportunity. Attracted by its growth prospects, web-based companies (Amazon, eBay, Salesforce.com), hardware vendors (HP, IBM, Cisco), telecom providers (AT&T, Verizon), co-location sites (SAVVIS, Rackspace), software firms (EMC/VMware, Oracle/Sun, Microsoft) and others are all jockeying for position in the cloud. Therefore, we must ask, "What role will satellite companies play?"

... Satellite communications is sometimes the only wide area networking (WAN) option for multi-national corporations with branch offices in remote or rural areas.

From a vendor's perspective, satellite based networks will be significantly impacted by cloud computing and its virtualized ecosystem. Satellite communications is sometimes the only wide area networking (WAN) option for multi-national corporations with branch offices in remote or rural areas. As these corporations embrace virtualization and cloud computing as part of their IT strategy, they need to make sure their branch offices continue to have access to the same IT resources. Vendors like Expand Networks have WAN optimization solutions that integrates with virtualization products and Space Communication Protocol Standards (SCPS) to improve the speed and performance of applications over satellite links to remote sites. Expand Networks recently worked with IPSTAR to optimize their broadband offering particularly for their banking and corporate customers, placing remote users in virtual proximity of critical business applications. WAN optimization and application acceleration technologies are also being used by TeleCommunication Systems (TCS) for its World-Wide Satellite Systems (WWSS) contract with the U.S.

Army. TCS partnered with Citrix to use their branch optimization solution to seamlessly deliver data and applications to troops on the ground. Therefore, we expect satellite vendors to continually adopt and develop new technologies to better integrate with cloud based applications.

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From a user's perspective, GeoEye was one of the early adopters of cloud computing. GeoEye processes large amounts of raw image data through a series of proprietary, compute-intensive applications for image sharpening, geocorrection, etc. According to GeoEye, traditional approaches to develop software applications at the scale required by the business was a growing challenge for their developers. Moreover, the company was concerned with the rising cost of building, operating and maintaining expensive IT infrastructure. GeoEye partnered with Appistry, a cloud computing application platform, to help offload its infrastructure requirements to the cloud. Now, GeoEye is able to quickly develop new imaging applications by leveraging the cloud infrastructure without being concerned about scalability and cost. The cloud solution allows GeoEye's developers to focus on algorithms rather than IT and reduces their hardware and software costs by an estimated 77% versus the traditional approach.

... Whether these ideas are realistic or not is not really the point, the point is that IT infrastructure is rapidly evolving

The cloud computing industry is in the early stages of the technology adoption cycle as many products are still "vaporware" that faces major hurdles particularly in the area of data security. However, we expect cloud computing in one form or another will eventually be part of most IT organizations due to its significant cost savings. The environmental benefits of cloud computing is also a key driver as many technology companies are going to great lengths to make eco-friendly data centers. As an extreme example, Google was recently awarded a patent for a floating data center that would be located 3 to 7 miles off shore that incorporates wave energy machines to create electricity from ocean waves to power its servers. Whether Google will actually build these floating data centers is debatable, but if Googlers can build a data center in the ocean, why can't the satellite industry build one in space? This was Jim Grady's concept when he presented the idea of "Cloud Computing On Orbit" which uses on orbit satellites powered by solar energy as space based server farms (see <http://satcom.nict.go.jp/English/e-50/SJOpinion.Web2.E.pdf>).

Whether these ideas are realistic or not is not really the point, the point is that IT infrastructure is rapidly evolving with cloud



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computing and the satellite industry is uniquely positioned to be a part of some very innovative technology solutions in the future.

By Kuni Takahashi  
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