

## Turning shortcomings in today's data center into new opportunities for investors

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The 'One-trillion-endpoint' era creates fertile ground for investment in new data center technology

The millions of people who use iPads, smartphones and netbooks to access myriad of files and apps expect 100 percent availability, unlimited downloads, unlimited storage, high compute power and zero latency. Individual demand for resources delivered through the cloud already rivals that of small enterprise and continues to grow. The way the back-end of the service equation adapts to accommodate unique demands of this market defines a new era of economic growth in IT that will generate new wealth for investors and entrepreneurs.

When I talk to clients and colleagues about this rapidly growing market, I refer to it as John-Q-Smith.com. Jqs.com is a hugely disruptive force that generates workloads characterized by wide excursions from mean utilization across every category of system resources: storage, power and compute capacity. Jqs.com is millions of users engaged in a variety of tasks – interactive gaming, video streaming, music libraries and so on – that tax the data center in unexpected and unpredictable ways.

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### Who is jqs.com?

The collage illustrates the diverse and demanding workloads generated by users of Jqs.com. It includes a man and woman in a 1940s style, a network diagram, a hand holding a smartphone, a CD-ROM, a laptop, a tablet, a game console, and a television.

A highly placed Cisco executive says the number of “endpoints,” or intelligent devices and people using them, will reach one trillion by 2013. This estimate keeps growing: last year it was hundreds of billions. This is jqs.com to the nth power, a perfect storm of demographic shift and technological innovation that opens a new era of opportunity for investors and the next generation of IT entrepreneurs. This opportunity is largely concentrated in the data center.

Investors are on the prowl for those companies, people and ideas that address and support dynamic resource allocation; that bring technical innovation to network, server and storage; that create business models that exploit the new opportunities.

To put this into context, consider the current infrastructure’s inadequacy to deal with instant demand for scalability, which is what jqs.com’s one trillion endpoints is all about. Or, from the other side of the equation, consider how the data center is optimized – some would say locked in – around growth in enterprise and handling enterprise workload extremes such as the compute-heavy needs of Internet search, the storage demands of a credit-card company or latency requirements of a stock exchange. In a world of one trillion endpoints, this static, one-dimensional orientation is insufficient.

Here are a few examples that illustrate the kind of change jqs.com is driving:

**1) Network management.** Advances in virtualization, failover and more sophisticated stack implementations enable rapid migration of workloads with the push of a button. But the effect of workload migration is practically negated by the several weeks needed for network configuration and optimization. This Wizard of Oz situation – the illusion of automated control masking a reality of complex, behind-the-scenes manual effort – begs for a better answer. Virtual network devices are a promising solution but they are currently at a very early stage.

**2) Server utilization.** Workload management is a huge problem. Typical server utilization rate in a colocation environment is only around 25 percent. A truly integrated view of the network would make workload migration easier to manage but that requires virtualization of more network-management functionality. Virtualization and other incremental technologies make it possible to achieve better rates: many anticipate 50 percent utilization. And, because the impact on OpEx is easily measured, investors are keenly interested in technologies that support automated workload migration and drive utilization up consistently.



**3) De-duplication.** We all understand de-duplication within the enterprise context but where is the solution that will de-dupe data across user classes? For example, I know many people besides me that have the Lady Gaga catalogue in the cloud. There is a tremendous opportunity to adapt enterprise modes of scalability and optimization to the unique demands of jqs.com.

**4) Power and cooling.** Dynamic power management is an especially knotty problem and the likelihood of disruptive innovation is low. Meeting the demands of jqs.com in this realm is a scalability problem, which is really an economy-of-scale problem. Adding power is a major expense and is actually more expensive when you add it incrementally. Putting advent of affordable new technology aside for the moment, the business-model question becomes, “What do I do with excess power capacity during slow periods? Sell it back to the grid?” Perhaps. A lot of work is needed in this area.

**5) TCO reduction.** Managed services providers are vulnerable to cost squeezes particularly in supporting SLA's. There is a clear need for cost-effective innovation that improves fault tolerance while reducing headcount (personnel is a big component of TCO). Ironically, attempts to design more fault-tolerance redundancy (clustering, etc.) result in higher costs as more personnel are needed to create and maintain failover. A host of tools needs to be developed to address this issue.

**6) Sub-virtualization.** Fractionalization of virtual licenses is a business-model innovation that could help smaller companies scale resources dynamically. But managed services providers stop short of fractionalizing VMware licenses, so there is no generally available model to help smaller companies compete. Microsoft and Amazon have options for dynamic scaling but neither offers a comprehensive practical solution and managed services providers haven't been terribly effective either.

The complex undertaking of data center design and build-out, which factors in government policy, power costs, the real estate market, semiconductor developments and software innovation is only compounded by jqs.com. The investor and the entrepreneur who hold an iPhone and understand the measurable opportunities in and around it – especially compared to ideas as nebulous as the cloud – have an appropriate appreciation for the very promising, very profitable horizon.

After years of doldrums, we believe the technology industry, the sector, is at the forefront of an investment cycle of unprecedented scale. If you have capital or ideas to invest, now is the time to capitalize.

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*Primary Global Research is based in Mountain View, Calif. The company provides expert fundamental industry data and analysis in eight industry sectors to buy-side investment firms. For the last two years, PGR has been named the Top Pick in IT and Technology sector research by Integrity Research Associates.*