Redshift: A radical change in the fabric of computing

Some companies are boosting their computing power to massive scales. Should your company? That depends on whether your company’s needs are blueshifting or redshifting. Greg Papadopoulos, Jonathan Schwartz and Jason Woods explain why these new business terms could define your company’s future.
A market-redefining shift is afoot in the information technology (IT) industry, one in which the consumption and delivery of computing is dramatically different from previous eras. Some areas of IT are experiencing geometric growth, while others seem confined to the more traditional computing patterns and requirements that have driven historical IT demands in most companies. In essence, we now have two distinct areas defining the IT marketplace, each with increasingly divergent requirements and demands.

Far-sighted executives will keep their eye on what we call “redshift” systems design and deployment; this is a global shift to network scale services, including “cloud computing” and software-as-a-service. Look carefully and you can see that the amount of investment and engineering pouring into redshift systems design and deployment suggests this style of delivering IT services will soon dominate the marketplace. The result: future growth in IT will be derived from non-traditional market segments, and the implications for technology producers, operators and consumers are far-reaching.

For example, as companies, industries, governments, societies and, in fact, entire economies increasingly connect to the network, massive investments in IT are underway to support swelling infrastructure demands. The manner in which and the metrics behind how companies extract value from IT is shifting. Industry data show that, historically, the majority of money spent on IT was consumed in supporting the internal operations of the business. In the near future, the industry-wide spending pattern in IT will inflect. Our model shows future investments in IT will soon be dominated by decisions to use IT principally as a competitive weapon – radically changing how companies should evaluate and think about IT. Although this transition is still incipient in nature, it’s no longer anecdotal (or negligible). As we see it, this transition to redshift computing is inevitable.

The redshift evolution
The story begins with a simple, but powerful, observation. Moore’s Law predicts the doubling of the number of transistors on an integrated circuit approximately every 18–24 months, which (in turn) has been a good predictor of increases in computer performance and, thus, the supply of computing potential in the marketplace. Given that price bands for computers have remained fairly stable over the past decade, Moore’s Law is, in practice, an enormous and vicious deflationary force: the cost of performing a given computation is cut in half about every 18 months.

Traditional computing demands represent markets that tend to experience growth rates in step with a company’s growth and, in aggregate, something closer to global Gross Domestic Product. Notable examples include a company’s demands for customer relationship management (CRM), sales force automation (SFA), enterprise resource planning (ERP), general ledger, payroll and the like. Many, but not all, of these functions are inwardly focused on the daily operations of the entity. They were daunting workloads for even the most powerful computers in the 1990s, but the computing demand for these functions is growing far less than the ability of computers to process them. Simply put, increases in computer performance over-serve the needs of many enterprise IT applications. The result: a contraction in the absolute number of computers demanded by this market segment. It’s no surprise, then, that businesses are looking to cloud computing, virtualization, consolidation, and other leading computing trends to maximize business options and gain efficiencies. Such trends point to one simple yet compelling observation: as advancements in technology outpace the growth demanded from traditional IT, fewer computers are required to serve this segment of the market. It follows that massive efforts are underway to improve utilization, increase productivity, consolidate workloads and otherwise improve the ROI metrics from the majority of computing architectures deployed over the last several decades. Further advancements in technology promise tomorrow’s businesses even greater options for leveraging even less silicon-per-unit of workload demanded. In astrophysics, scientists use the word blueshift to talk about visible light moving toward the blue end of the...
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The shift to massive scale
Classifying IT needs as redshifting or blueshifting allows us to leverage research from International Data Corporation (IDC), the IT industry’s largest quantitative analysis firm, to determine their relative growth rates. The market research (IDC Custom Research sponsored by Sun, Sun Redshift Workloads Research, September 2007) compares the number of server revenue and units, storage revenue and storage terabytes (or capacity) – all tied to compound annual growth rate (CAGR) for segments of the market categorized as redshifting.

The research reveals that the market demand for redshift-related servers and storage, both in terms of the number of physical units and revenue, is accelerating through 2011. The research also shows that the growing demand for redshift systems presents growth rates that far outpace overall market growth. Today, redshift systems represent a limited, but fast-growing segment of the market;
however, within the next few years, redshift infrastructure will become the dominant IT design and deployment style. This architectural shift in the marketplace will drive foundational changes for infrastructure providers, technology operators and consumers. At a basic level, redshift infrastructure emphasizes scale efficiencies; so we expect the world will evolve around fewer, but much larger, computing installations. Graphically illustrating the extreme growth in just one of these redshift categories, figures 1 and 2 show IDC’s predicted growth in redshift storage revenue and terabytes, respectively, through 2011.

More telling, of course, is the conclusion one can draw from the research. A fundamental phase change is underway. Computing is destined to follow in the footsteps of its more mature industry predecessors, such as energy, transportation, telecommunications and power utilities: computing (not to be confused with computers) is becoming a commodity. And the journey towards the commodification of computing promises a new world of efficiencies and opportunities for both classic and newly emerging businesses.

**Youshift?**

How does all this affect you and your company? Much depends on what kind of business you operate. As numerous market experts have pointed out, massive investments are being made to...
executives should understand that these fast-growing business services will require innovative, brutally efficient redshift infrastructure to handle steep growth rates.

Executives should consider questions such as the following:

- What metrics will we use to measure the efficiency of the company's existing computing capability, both from a technology and business success perspective?
- Can we leverage another organization's redshift systems to avoid capital expenditures?
- How will we invest more time in carefully evaluating products and services from vendors?
- What are our costs to acquire, operate and exit a technology or service?

As IT markets and associated technologies become more complex, both the IT industry and its customers must change the models used for investing in and extracting value from technology goods and services.

As the above questions turn into well-researched and fully discussed answers, a key priority for executives will be to determine what IT functions should be kept in-house and self-managed compared to functions that should be out-serviced through a qualified third party. When considering the above, a few simple rules can help; these rules can be quickly charted (see Figure 3).

Areas in which IT is largely undifferentiated (that is, managed primarily as a cost) are blueshifting and are typically ideal candidates for out-servicing. For many new businesses, it makes little sense to invest in their own ERP or CRM systems when the value to the business is undifferentiated. Instead, companies should consider ceding operational control and outsourcing these core services. Doing so allows a single company's blueshifting expense to be optimized leveraging another company's redshift scale and efficiencies.

Within your enterprise, there are two primary areas in which your company should keep control of its computing capability (and possibly expand it). First, segments of your business in which technology is used as a competitive weapon in the marketplace, that is, in which your business can garner a unique and differentiated capability compared to your peers through technology. Mega technology consumers such as eBay and Google are good examples of large
companies whose IT budgets are dominated by investing in technology to not only run the business but also to grow top-line revenue. Correspondingly, businesses of all sizes needing to solve industry-specific challenges such as cargo loading and delivery, an airline looking to optimize its revenue management systems, or a financial services company performing complex risk analysis computations on its investment activities all are examples of technology used within the department or within the business unit to increase the company's market competitiveness. These activities all require a redshift-style approach to technology consumption and delivery. They are often fast-growing, highly efficient, and business-specific implementations of IT. For these initiatives, maintaining architectural, and frequently operational, control is critical.

Secondly, companies should keep control of internal environments such as identity management, key process and workflow technologies and ownership of service composition and orchestration activities. These foundational IT capabilities should be kept in-house for strategic reasons and not be ceded to third-party operators.

Putting it all together
The next wave of leading-edge enterprises will excel in putting it all together. They will leverage technologies such as identity management, security, service-oriented architectures and various programming models and languages to effectively and efficiently create bridges between their own core IT systems and emerging, fast-growing redshifting business services.

First order, executives should decide where to utilize IT-as-a-weapon versus IT-as-a-cost and deploy redshifting- or blueshifting-type strategies and architectures respectively. Concomitantly, steps should be taken to maximize business options with “everything as a service” architectures (becoming popularly known as cloud computing). These include designating open infrastructure platforms for the applications maintained in-house and insisting upon open services for outsourced applications. Conceptually, “open services” is to services as “open source” is to software. When outsourcing it's important to insist that:
- all interfaces and formats are open and standard
- you always own the data
- you own the relationships and metadata, and
- you can extract, sync or purge your information unilaterally from a service provider

Ensuring a company's oft-increasing technology bets are maximally leveraged and aligned to achieve corporate objectives is crucial. Many enterprises employ detailed strategies and techniques to measure the Total Cost of Acquisition (TCA) and the Total Cost of Operating (TCO) IT and link these analyses to planned projections or corporate outlooks. Unfortunately, many enterprises fail to consider the enormous barriers associated with exiting a technology or platform. In today's marketplace, flexibility and efficiency are key to maintaining competitive options. Frequently, the Total Cost to Exit dwarfs the TCA and TCO.

Enterprises should consider that as IT shifts to a new model, new methodologies are required and new strategies taken to deliver maximum return from investments in IT. As redshift architectures will soon dominate IT infrastructure, business efficiency, openness and flexibility should be paramount concerns for every executive, technical and non-technical alike. ■

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