## Predictions: Tech Trends – part 1 – 2016

RFG Perspective: The global economic headwinds in 2016 will once again constrain IT budgets; that, combined with the new digitally disruptive entrants, will force IT executives to accelerate the restructuring of their organizations. The rapidly changing business climate is pushing IT executives to do much more with less. Additionally, there are new waves of next-generation technologies emerging and maturing that challenge the existing status quo and deserve IT executive attention. These technologies will improve business outcomes as well as spark innovation and drive down the cost of IT services and solutions. IT executives must strategize with business executives to select and fund the next-generation technologies or find self-funding approaches to implementing them. IT executives will also have to provide the leadership needed for properly selecting and implementing cloud solutions, or control will be assumed by business executives that usually lack all the appropriate skills needed to tackle outsourced IT solutions.

As mentioned in the RFG research report "Plan Conservatively for 2016" the global economic environment will remain weak within the U.S. and weaker outside, thereby keeping IT budgets contained or shrinking. Additionally, the further collapse of oil prices to below breakeven for most suppliers will ripple through multiple industry sectors causing revisions to strategies, revenue projections, budgets, and IT initiatives and staffing. Therefore, IT executives will need to invest in next-generation technology to contain costs, minimize risks, improve resource utilization, and deliver the desired business outcomes. Below are the top areas that RFG believes will be the major technology initiatives that will get the most attention.

Enterprise IT 2020   Tech-Driven Business Transformation
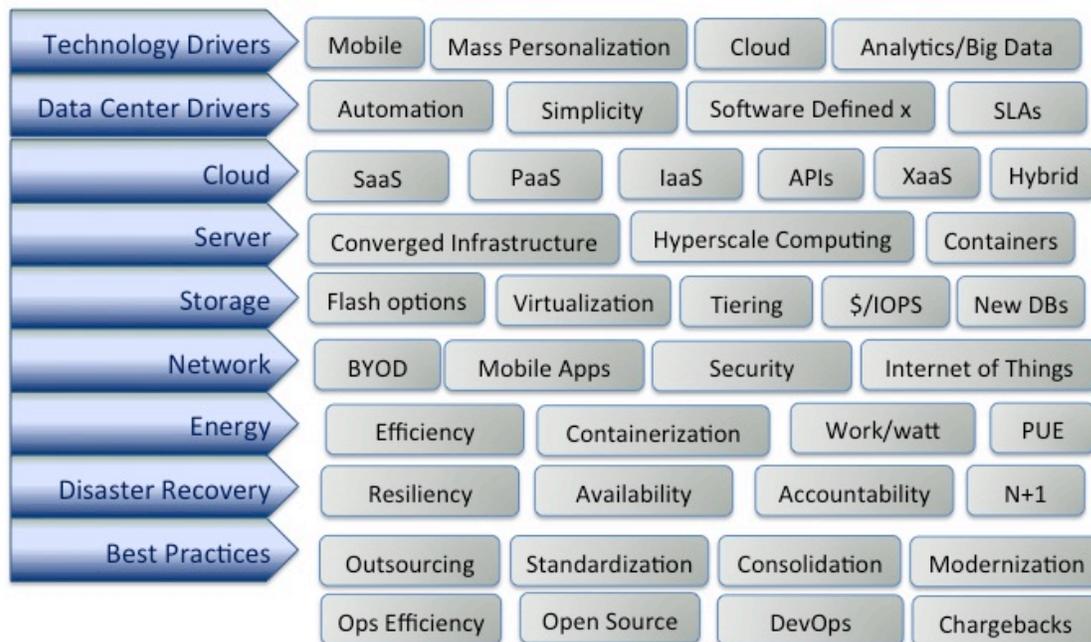
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Analytics – In 2016, RFG expects analytics to become tightly intertwined with systems of engagement and systems of record. The leading edge companies will be creating systems of insight that meld these systems together and add in the analytics components so that real-time personalized analyses can be used to augment marketing, privacy, revenue generation, and security objectives. This merger of analytics with real-time transaction processing is instrumental to mass personalization (discussed below).

API economy – The ability to utilize cloud applications and microservices through standard APIs will quicken the pace of delivery of new, innovative applications by new digital disruptors across multiple industry sectors. This will force existing industry players to follow suit. This methodology is already shaking up more than IT – it is lowering the barriers to entry and enabling entrants to provide services at lower costs. Look for 2016 to be another big year of disruption.

Big Data – The hype about Big Data solutions is butting up against the realities associated with the actual implementation of these solutions. While there are successes, the discussions now will tend to deal more with the challenges and failures that occur and what can be done to overcome the issues, such as employing in-memory and NoSQL databases. RFG views this as the usual next step in the maturation of the technology.

Cloud – The cloud market will continue to grow with private cloud implementations exceeding those of public clouds. However, business and IT executives are beginning to learn that implementing a cloud platform is more complex than initially thought. Moreover, the bifurcation of cloud APIs and standards means that the selection of a cloud platform implies making a proprietary choice. Infrastructure as a Service (IaaS) solutions are starting to blur the Platform as a Service (PaaS) ones. OpenStack will continue to get much of the hype and vendor support while CloudStack struggles to survive. Cloud Foundry distributions will pick up momentum and become a *de facto* standard.

Cloud Service Providers (CSPs) and Managed Service Providers (MSPs) – CSP and MSP competition and pricing pressures will not abate in 2016, as providers vie for market share. Nonetheless, Software as a Service (SaaS) will remain the cloud revenue leader with **Salesforce.com** the dominant player. **Amazon** Web Services (AWS) will retain its overall leadership of IaaS/PaaS providers with **Microsoft**, **IBM**, and **Google** holding onto the next set of slots and owning more than 50 percent of the market throughout the year. **Oracle's** bravado of becoming a leading player as a CSP will not occur in 2016. Because the leading CSPs do not share common APIs, interoperability will be a major inhibitor to cloud growth, as users plan on utilizing more than one cloud platform. There will be limited movement by the providers to fix this, as it is not in their best interests. Users will need to pick their CSPs carefully.

Consolidation – Data center consolidation will continue as users move applications and services to the cloud and modernize and standardized internally run applications and platforms. Advancements in cloud offerings along with a diminished concern for cloud security will lead to more small and mid-sized businesses (SMBs) to shift processing to

the cloud and operate fewer internal data center sites. Large enterprises, worried about interoperability, scalability, and security, will look to utilize clouds and colocation sites for development/test environments and handling spikes in capacity. For the most part large enterprises will limit business- and mission-critical production systems to in-house or company-managed colocation sites, although there will be experimentation in moving mission-critical applications to select cloud providers.

Containers – In early 2014 discussions on containers referred to modularization of data centers but in 2015 the conversations on containers switched to mean software that encapsulates applications or other workloads. **Docker** is the primary driver of this phenomenon and has become an accepted standard. While Docker is a leader in this space, its ecosystem has become kludgy, which will provide an opening for other options in the market place to gain traction in 2016. RFG expects the discussions to evolve from Docker only to all options as well as the clarifications on the extent of what works and what is yet to be resolved.

Converged Infrastructure – Converged infrastructure encompasses converged architecture, expert systems, and partially integrated systems as well as expert integrated systems. The major players in this space are **Cisco**, **EMC** (including VCE), **Dell**, **HP**, and Oracle. These systems have been on the market for a couple of years and adoption is gaining speed. However, the fastest growing providers are the smaller and white box players. Converged infrastructure systems do result in productivity, time and cost savings and IT executives that have not done so should be piloting them as well as software defined solutions (software defined data centers, software defined storage, etc.) in 2016 to determine the role and value they can play in the corporate data centers.

Data center transformation – The process continues apace. However, for IT executives to achieve the levels of operational efficiency required, they will have to increase their commitment to data center transformation before it is too late. The productivity improvements will be achieved through the use of the shift from standalone vertical stack management to horizontal layer management, relationship management, the use of cloud technologies, and implementation of DevOps. One of the biggest effects of this shift is an actual reduction in operations headcount and reorientation of skills and talents to the new processes. IT executives should look for the transformation to be a minimum of a three-year process but could be a lot longer depending upon the level of cultural resistance. In addition, the average data center power usage effectiveness (PUE) remains around 1.80 – 2.0 whereas optimized solutions enable a savings of up to 40 percent – driving PUE to 1.20 or less.

DevOps – The trend toward DevOps will gain momentum in 2016 but it does represent a significant cultural change to IT development and operations. The challenge is not the technology, of which there is much to implement, but overcoming the organizational resistance to change as well as the acceptance of new, and expanded, roles and responsibilities for developers. The transformation will also dramatically reduce the size

of the operations staff, which will be passively aggressive in its attempts to slow the process.

3-D printing – Stories of 3-D printing successes in healthcare and manufacturing are gaining attention, which should make 2016 a solid growth year for 3-D printing. Over time the use of 3-D printing will revolutionize the way companies produce materials and provide support services, including self-help components. Leading-edge companies will gain a competitive advantage from their first-mover advantage. This is still an early stage technology.

Energy efficiency/sustainability – This remains a low priority for most executives; however, IT executives should be making it a part of other initiatives and a procurement requirement. RFG studies find that energy savings is just the tip of the iceberg (about 10 percent) that can be achieved when taking advantage of newer technologies. RFG studies also show that in many cases the energy savings from removing hardware kept more than 40 months can usually pay for new better utilized equipment. Or, as an **Intel** study found, servers more than four years old accounted for four percent of the relative performance capacity yet consumed 60 percent of the power. The half-life of IT hardware is less than three years; IT executives should act accordingly and lease, outsource or rent.

Internet of things (IoT) – The use of sensors in appliances and other products will mushroom throughout the year, which will automate and improve life for consumers, in IT and in the physical world. Sensors will enable IT operations staff to better monitor and manage system capacity, maintenance, and utilization while businesses will be able to incorporate them into their mass personalization experiences as new and enhanced applications incorporate IoT into their user interactions and workflows.

Linux and open source – Linux and open source technologies are now mainstream in data centers and in clouds. Most cloud stacks (excluding Microsoft, of course) are built upon Linux and open source technologies. Moreover, each of the software vendors leaping into the CloudStack, Docker, or OpenStack ecosystems are building solutions extending the space, with Microsoft again being the exception. RFG expects 2016 to see continued growth in this area and general acceptance by enterprises that Linux and open source are the way to go for new solutions.

Mass personalization – Analytics, big data, mobile and social are all coming together to create unique interactive experiences for consumers. Mass personalization means each individual will be presented with content uniquely tailored for him or her. On the business side this is geared to drive loyalty and revenues. But on the IT side, it will represent a major change to applications, databases, and the underlying platforms. It will be transformative on both sides, with new disruptive players leading the way and the traditional firms struggling to catch up in both dimensions.

Software defined x (SDx) – Software defined networks, storage, data centers, etc. are all the latest hype. 2016 will see the transition from hype, vaporware, and limited

functionality to a few delivered solutions. However, since the software-defined market is quite immature, IT executives should be wary and should lower expectations at this time. Therefore, IT executives should limit usage to pilots and roll out into production environments only after being fully satisfied with the results. Over the next two to five years SDx will mature and start to become robust.

Storage - Flash SSD et al – 2016 will see an extension of the storage revolution. Flash, solid state drives (SSD), thin provisioning, tiering, and virtualization are advancing at a rapid pace, as are the densities and power consumption curves. The cost differential between enterprise flash and high performance hard disk drives (HDDs) running at 15,000 and 10,000 RPMs will be gone on a pure dollar basis per gigabyte of storage. But on a cost per IOPS basis flash drives and PCIe cards will be far more economical. 2016 will see adoption accelerate creating the opportunity for significant savings at most firms. In fact, most data centers use quite a few high performance HDDs, of which most are short stroked. Over the next few years flash and SSDs will become dominant in this market and the high performance HDDs will become history. Look for 2016 to be a watershed year.

RFG POV: 2016 will likely be another challenging year for IT executives and keeping pace with technology advances will have to be part of any IT strategy if executives hope to achieve their goals for the year and keep their companies competitive. This will require IT to understand the rate of technology change and adapt a data center transformation plan that incorporates the new technologies, including clouds, at the appropriate pace. Additionally, IT executives will need to invest annually in new technologies to help contain costs, minimize risks, and improve resource utilization. IT executives should consider a turnover plan that upgrades (and transforms) a third of the data center each year and phases out the legacy platforms that have been around far too long. IT executives should collaborate with business and financial executives so that IT budgets, plans and strategies dovetail with the business and remain tightly integrated throughout the year.

Additional relevant research is available at www.rfgonline.com. Interested readers should contact RFG Client Services to arrange further discussion or interview with Mr. Cal Braunstein.