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The New Language of Cloud Computing

A Market Insight by Frost & Sullivan
in collaboration with F5 Networks Inc.

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INTRODUCTION

Enterprises today are ushering in an exciting new *"Cloud era"* characterized by high levels of flexibility, agility and innovation; and low levels of risks and capital expenses. With growing adoption, the cloud is no longer just a buzzword in the technology landscape, it is changing the way we discuss, evaluate and implement cloud-based solutions. While everyone is talking about the cloud, the conversation is evolving with technologies such as big data, analytics and Internet of Things becoming increasingly cloud-based.

To examine enterprises' perception and adoption of cloud computing, Frost & Sullivan surveyed 420 decision-makers from organizations involved in government, eCommerce, as well as banking, financial services and Insurance (BFSI) sectors across Australia, China, Hong Kong, Japan, Singapore and South Korea. Based on the findings of the survey, Frost & Sullivan has observed the emergence of a distinctive new "*Language of Cloud Computing*". This whitepaper discusses the evolution of this new language and discusses its implications for enterprises' future cloud strategy.

THE RISE OF A NEW LANGUAGE

Cloud computing is a primary consideration for enterprises across the Asia-Pacific region with 58.6% of decision-makers identifying it as their #1 priority in the next 12 months. The focus is resulting in high levels of cloud adoption. As illustrated in Figure 1, 91% of enterprises are currently in the planning or implementing stage; or already using cloud services.

Figure 1: Cloud Computing by Stage of Adoption

A large number of companies adopting cloud services are looking to complement their existing IT set-up, while one-fifth are looking to augment it.

9.0% No plans for usage at the moment

23.8% At the planning stage

32.6% In the process of implementing

34.5% Currently using cloud services

Transform
7.1%

Enhance
**24.9%**

Augment
20.7%

Complement
47.4%
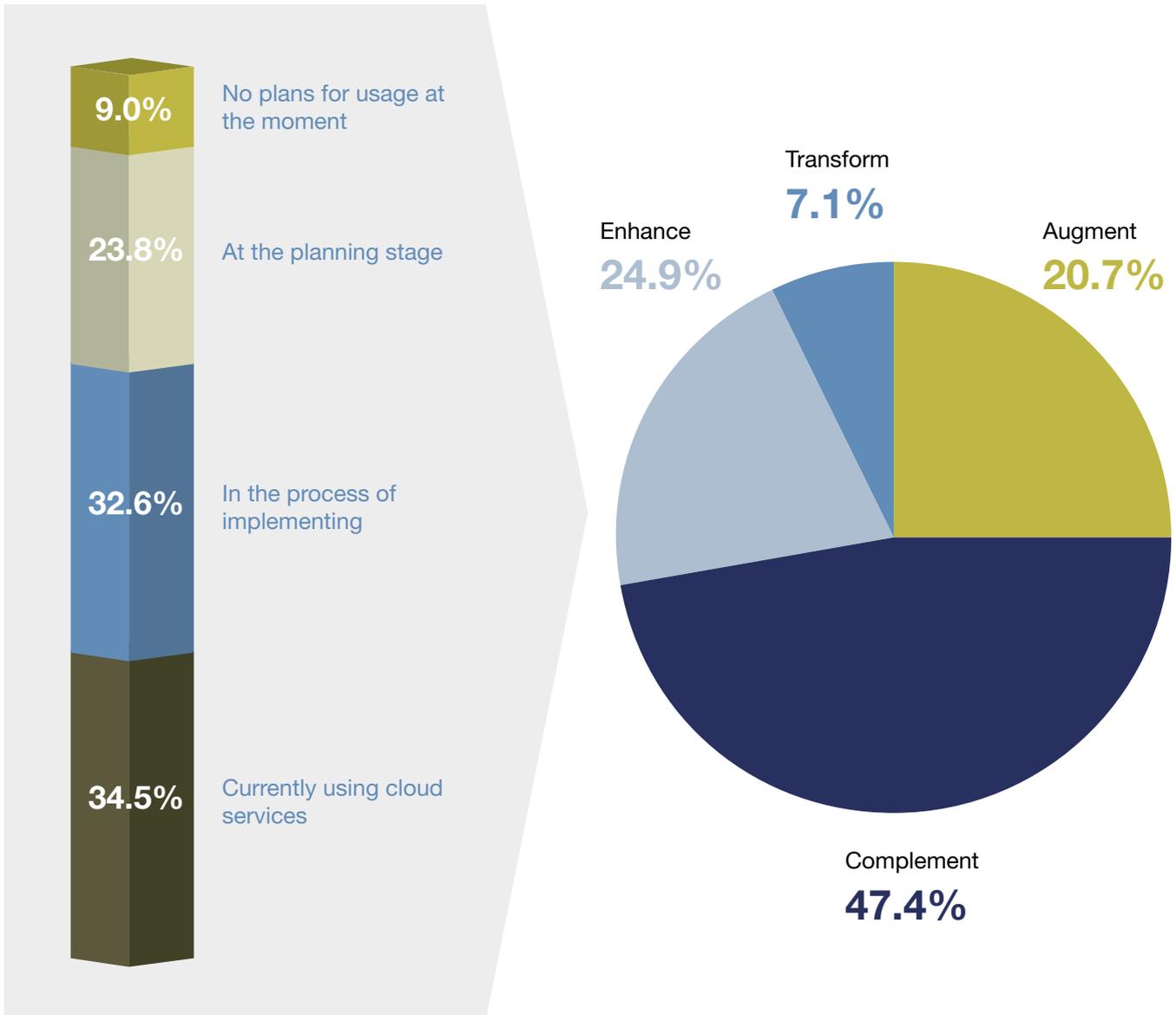
Source: 2014 Frost & Sullivan Cloud User Survey

The high adoption levels underscore the wide depth and breadth of cloud services to meet the varying needs of enterprises and end users – be it business or technology decision-makers. The findings also reflect the increasing levels of cloud education and awareness among end users. About 83% of decision-makers believe they have a good grasp of cloud computing concepts and are knowledgeable about the differences between public, private and hybrid forms of cloud computing.

Furthermore, enterprises have clear cognizance of the actual benefits of cloud services beyond cost-savings, i.e., its role in driving business model innovation and experimentation without increasing capital expenditure or other risks. Three out of four decision-makers agree that cloud services are a solution to "faster speed to market and increase competitiveness"; while 70% agree that cloud computing "is a critical component in any business transformation strategy".

Figure 2: Top Two Benefits of Cloud Adoption

Cloud can be a solution to faster speed to market and increase competitiveness

75.2%

Cloud is a critical component in any business transformation strategy

70.0%

0%   20%   40%   60%   80%
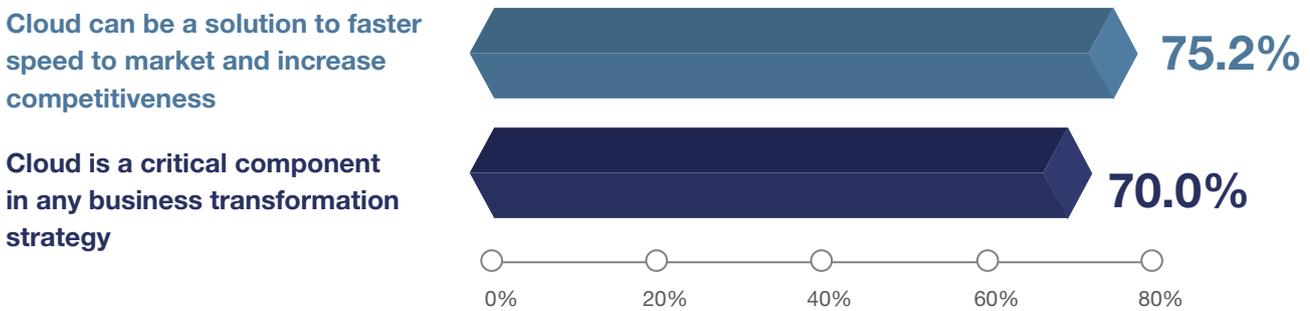
Source: 2014 Frost & Sullivan Cloud User Survey

Based on the survey, Frost & Sullivan has established a four-point A-B-C-D framework that characterizes the new language of cloud computing (Figure 3):

Figure 3: The New Language of Cloud Computing

A **Applications** - more outsourcing of strategic/core workloads

C **Customers** - inclusion of customers to the IT user pool

B **Business Decision Makers -** expanding the role of business decision-makers in IT planning and procurement

D **Defense** - security and privacy of IT environments remains a key focus
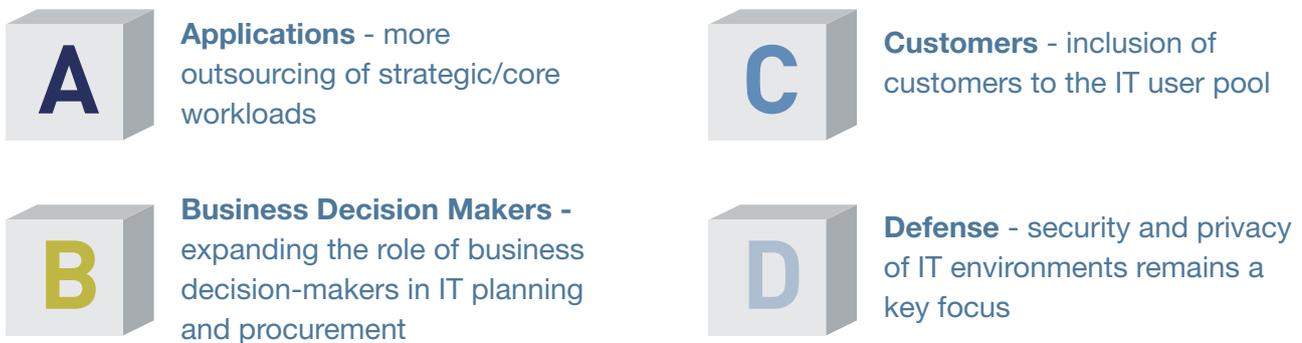
Source: 2014 Frost & Sullivan Cloud User Survey

Applications: More Outsourcing of Strategic/Core Workloads

Companies today run a tremendous number of workloads within their IT environments, with some enterprises running more than 100 concurrent workloads. Most of these applications demand differing sets of requirements and characteristics. When embarking on the cloud adoption journey, enterprises are selective about the workloads they shift to the cloud and perform rigorous risk-benefit analysis before making the move. Typically, conferencing and collaboration workloads such as email and audio/video conferencing, and office productivity applications are the first to move to the cloud. With the commoditization of compute, IaaS is also witnessing substantial adoption.

Mission-critical applications, such as Enterprise Resource Planning (ERP), security, and financial/accounting, are traditionally hosted on-premise as they involve sensitive business data, custom solutions, and core production environments. However, this is changing as both cloud-based services and service provider processes are beginning to demonstrate the capability and maturity to run these core workloads alleviating major concerns surrounding data privacy, compliance and loss of control as inhibitors for cloud adoption.

This confidence is reflected in the survey with most enterprises either already using or are beginning to use ERP, content security, and finance/accounting workloads from the cloud.

Figure 4: Adoption of IT Workloads
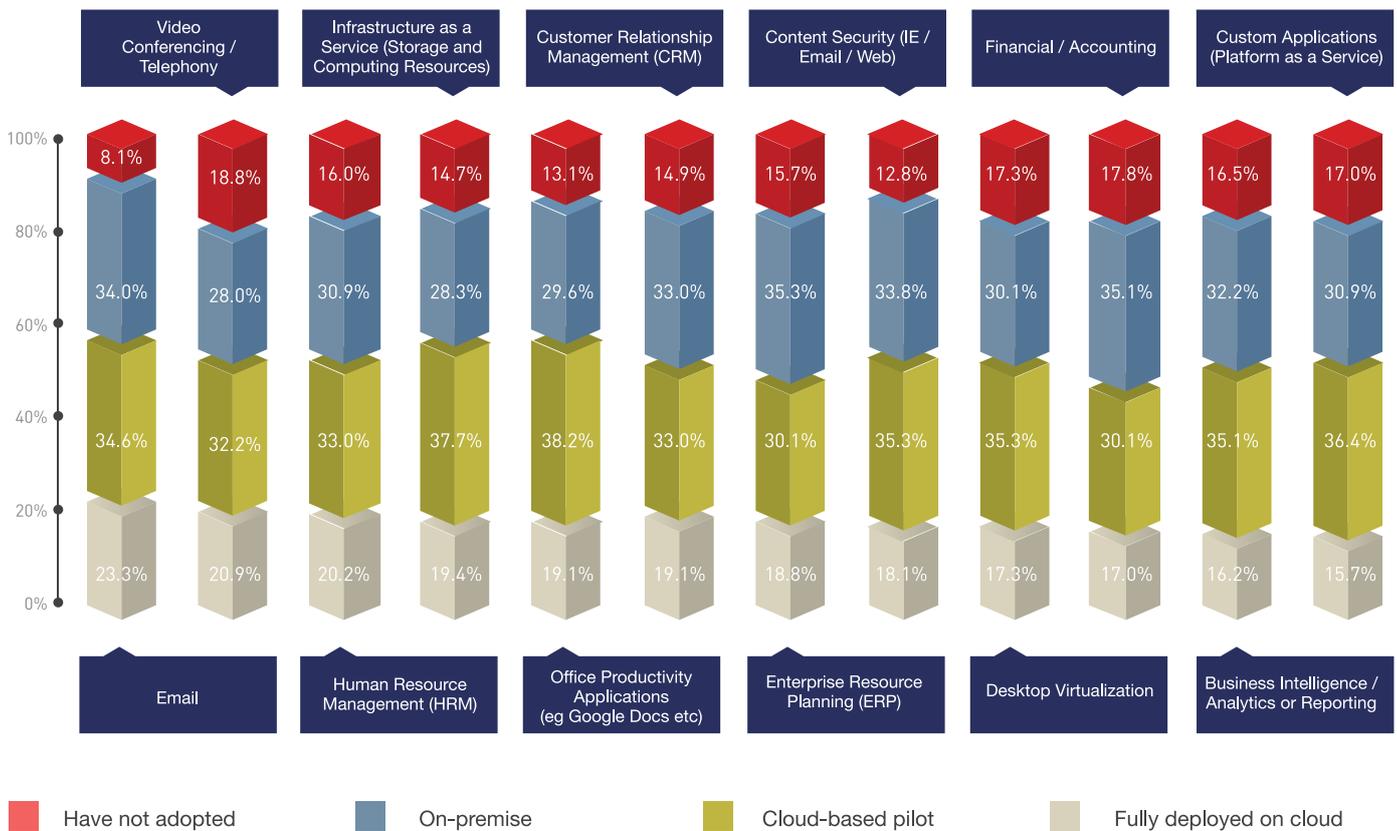
Source: 2014 Frost & Sullivan Cloud User Survey

This has been driven by lower latency over the network and enhanced Service Level Agreements (SLAs) from cloud service providers. Today's enterprises have sufficient confidence to migrate more critical workloads to a cloud environment, or directly adopt cloud-native applications, to maximize business agility and encourage innovation.

Business Decision-Makers: Expanding the role of Business Decision-Makers in IT Planning and Procurement

With a growing number of enterprises looking to migrate their applications to cloud environments, the decision-making process within the enterprises is getting more complicated than ever before. The self-service nature of cloud solutions combined with the pervasiveness of self-owned devices in an enterprise environment, is shifting decision-making away from IT to multiple business leaders across the organization. In some cases, even external parties are involved.

Figure 5: Involvement of Various Roles at Different Stages of Cloud Services Purchase Lifecycle
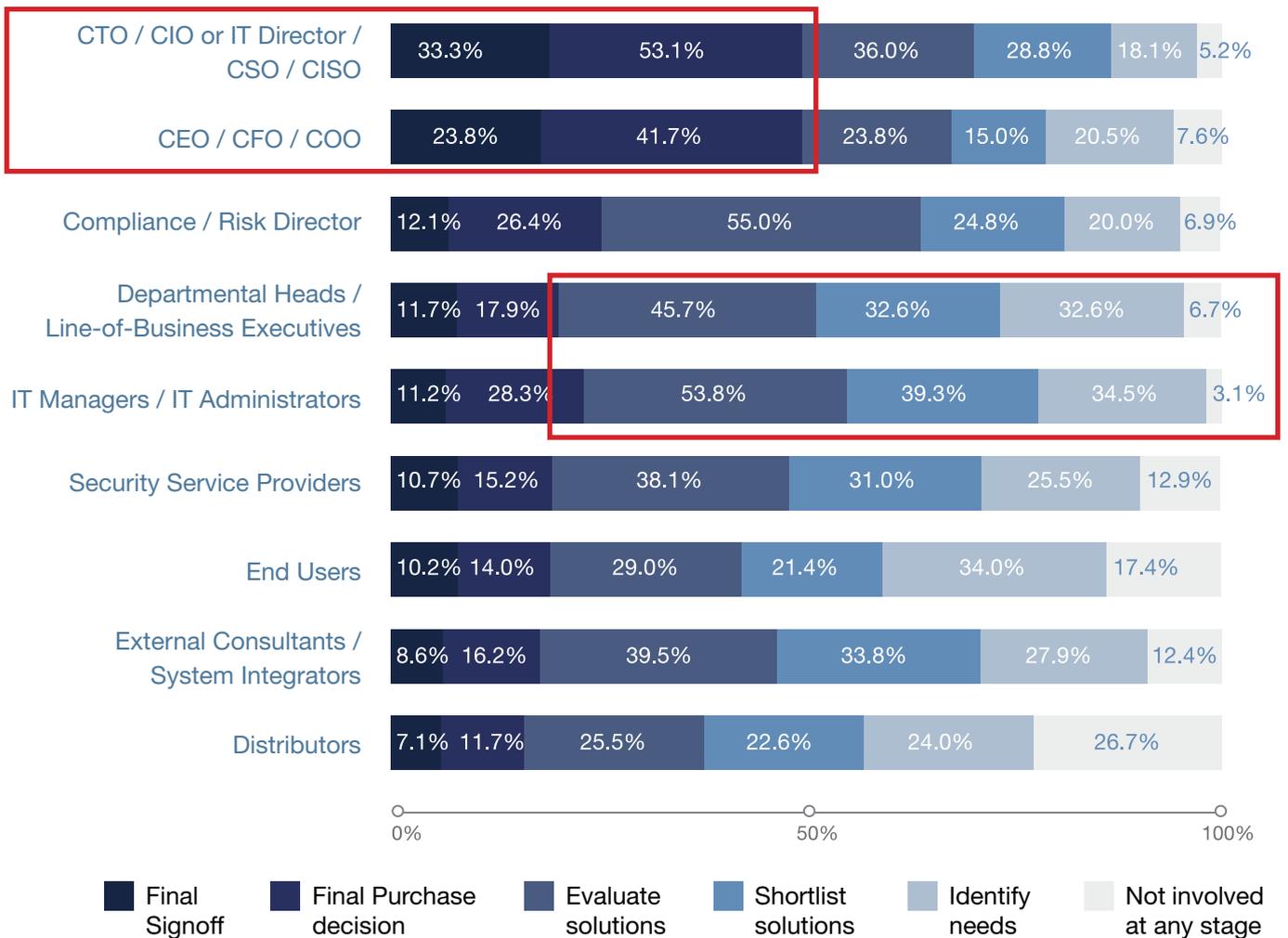
Source: 2014 Frost & Sullivan Cloud User Survey

As illustrated in Figure 5, apart from IT-line executives, business-line executives are heavily involved at every stage of the cloud services purchase lifecycle. Both departmental heads and IT managers play a major role in identifying needs and shortlisting cloud solutions in an organization; compliance/risk directors take the lead in evaluating solutions and risk management; and CEOs/CFOs/COOs join CTOs/CIOs in making the final purchase decision and signing off on cloud agreements.

In some cases, business-line executives carry out cloud projects without the involvement of the CIO-led IT department or directly outsource certain operations to external IT service providers. This is giving rise to a very real security and management challenge known as "Shadow IT"[1]. While the lack of collaboration between business and IT lines is reducing, it still requires close monitoring. It is also worth mentioning that end users also contribute heavily in the initial stage of needs identification, which underpins enterprises' determination to incorporate customer requirements into core business strategies. This directly links to the next pivotal keyword in the new cloud language – the Customer.

Customers: Inclusion of Customers to the IT User Pool

Traditionally, cloud adoption-related discussions have mainly revolved around cost savings, application deployment, resource optimization and business agility. The discussions primarily focused on the internal enterprise and ignored the customer, a key segment of the IT user pool. However, several forward-looking enterprises are progressively shifting their strategic direction from being business-centric to customer-centric. These enterprises are moving beyond the obvious cloud-related questions and its implications on the organization to evaluating what cloud means to their customers and how they can leverage it to enhance the customer experience and value delivered.

Figure 6: Factors Favoring the Adoption of Cloud Computing

Overall

%	Factor
72.6%	Facilitate resource optimization
70.7%	Enable us to manage / execute disaster recovery plans more seamlessly
70.5%	Provide flexibility to meet businees demand (peaks & troughs) via real-time / on-demand computing
69.8%	Enable us to focus more on our core business competencies
69.3%	Enhance internal business processes
69.3%	Engage customers more effectively
68.6%	Lower overall IT cost (shifting CapEx to OpEx)
64.3%	Enable us to deploy more leading edge / 'greenfield' types of applications
61.9%	Enable us to penetrate new markets and channels
59.0%	Enable us to avoid vendor lock-in

50%   60%   70%   80%

Source: 2014 Frost & Sullivan Cloud User Survey

[1]Shadow IT refers to IT systems and solutions built and used inside organizations without organizational or IT team approval.

From Figure 6, we observe that most decision-makers continue to strongly agree with the traditional factors driving cloud computing. However, the emphasis on "engaging customers more effectively" is a change from tradition. Customers are beginning to be included in the IT user pool of enterprise applications and exert tremendous influence on the initial system configurations. This is a starting point for the cloud services' portfolio expansion where it evolves from being a back-end service to including front-end services for customer engagement requirements.

Defense: Security and Privacy of IT Environments Remains a Key Focus

Data security and privacy are perennial topics related to any cloud discussion, whether it is about application, business or customers. According to the survey, when accessing applications via the cloud, the security of the cloud is ranked among the most important attributes. In fact, it is highlighted as the biggest impediment in adopting cloud services for 68% of enterprise decision-makers.

From a business standpoint, data security threats/risks to the business is another top concern associated with cloud computing adoption. Network security, web application firewall, and identity and access management are rated as the most critical components in enterprises' plans for building private clouds; the perceptions are similar across different countries (Figure 7). Furthermore, significant regulatory compliances need to be met when handling customer data, especially for organizations from the BFSI and healthcare industries.

Figure 7: Criticality of ICT Components in Building Private Clouds
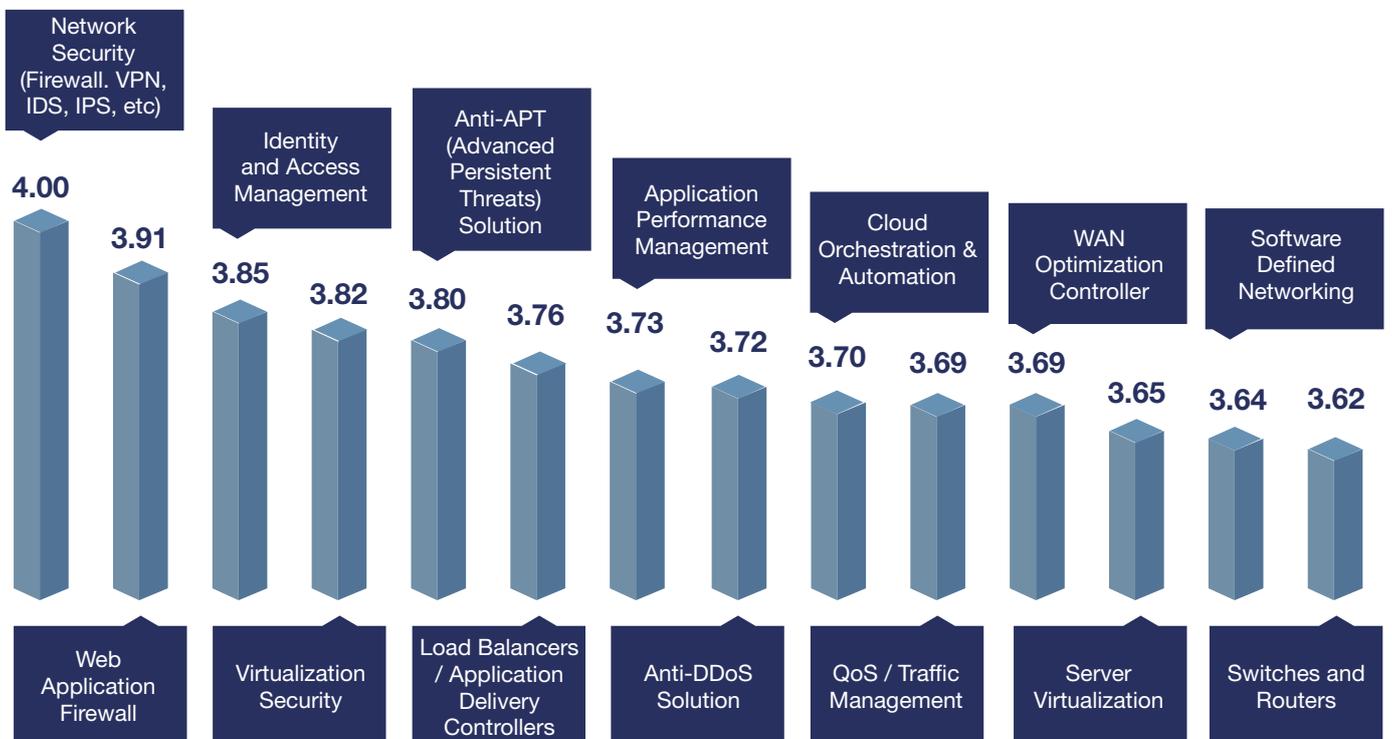
Source: 2014 Frost & Sullivan Cloud User Survey

In addition, security is of principal importance for both enterprises and service providers. When enterprises are evaluating or selecting a cloud service provider, security and privacy standards are top-of-the-mind concerns, followed by the need for a local support team. Enhanced security and privacy standards are likely to help increase a service provider's competitive edge when bidding for new cloud deals.

The survey highlights positive feedback from several progressive enterprises that have embraced cloud computing and experienced its real benefits. These enterprises demonstrate greater confidence towards cloud services and their ability to meet the companies' security requirements. For these enterprises, the focus is more on SLA discussions.

WHAT IS PROMPTING THIS CHANGE?

Cloud computing undeniably offers tremendous benefits to enterprises and consumers. Enterprises in the Asia-Pacific, mainly spurred by the need for resource optimization, business continuity, and ultimately, business agility, continue to gravitate towards cloud computing. In comparing enterprises' cloud conversations today with the ones three years prior, we can observe a change in focus points. The primary driving forces behind these changes are outlined below:

Move towards a hybrid cloud environment drives workload outsourcing:

The hybrid cloud can function as an extension of an existing IT environment with the same management tools and governance policies in place. This allows IT to swiftly deliver the agility and flexibility of cloud computing while maintaining security, control and visibility. Enterprises are increasingly leveraging the advantage of hybrid cloud by migrating most their workloads to a hybrid environment.

Business IT alignment encourages collaborative decision-making:

Business IT aims to integrate IT as a key component of the business strategy, mission, and goals. This is a key enabler for enterprises' business transformation where the organizational structure is redesigned to fully realize business efficiencies made possible by new IT. Collaborative decision-making is an essential mechanism under this concept and sets the foundation for innovation.

Emphasis on customer experience drives higher customer involvement:

While enterprises leverage cloud to improve business processes, align IT portfolios, build new applications and integrate IT systems, the ultimate objective is to improve customer experience. In order to retain customers or acquire new customers, an increasing number of enterprises are transforming themselves into customer-centric organizations, by listening to customers' needs at various operational stages. Furthermore, these companies are introducing new innovations in customer-facing technology to derive and maintain differentiation.

**Cloud computing threats lead to security and data privacy concerns:**

The extensive list of cloud computing threats include data breaches, data loss, account or service hijacking, insecure APIs, denial of service, malicious insiders, and other unexpected threats. Since there is no omni patch that can avert all threats, enterprises need to be highly-vigilant about security issues and risks associated with the cloud.

IT IS A NEW LANGUAGE BUT, EVERYONE SPEAKS IT DIFFERENTLY

The new language of cloud computing has arrived and it is here to stay. However, as is often the case with any new language, the pace of adoption varies at different parts of the region. The six countries – Australia, Singapore, Hong Kong, China, South Korea, and Japan – covered in the survey are all relatively mature cloud computing markets in the Asia-Pacific region. That stated, the political, economic, social and technological (PEST) environments in each country are significantly different, which may potentially affect their enterprises' perception and adoption behaviors toward cloud computing.

Based on the survey, Frost & Sullivan has created a model to benchmark the six countries across the four tenets of the new language – Applications, Business Decision-Makers, Customers and Defense (Figure 8). The survey highlights the rise of cloud computing in China in recent years; leading in three out of four areas: Applications, Customers and Defense. China has been at the forefront of cloud adoption in the past 12 to 18 months and the survey findings confirm that enterprises in China are leapfrogging technology cycles given their limited investments in legacy infrastructure, a key difference between China and the other five countries surveyed.

Figure 8: Country Benchmarking Model
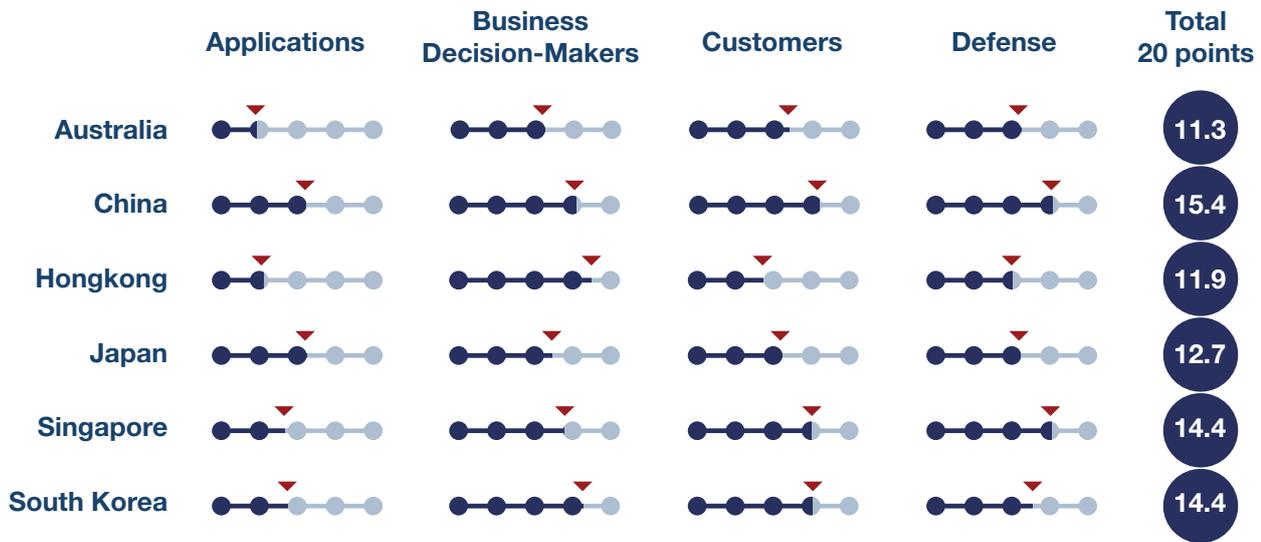
Source: 2014 Frost & Sullivan Cloud User Survey

While China leads the benchmarking framework by a full 4 points, it is interesting to note that Hong Kong and Australia make up the fifth and sixth spots, respectively. The following section explores the key distinctions between each of the markets in the Asia-Pacific region.

Australia

As one of the most mature cloud services markets in Asia-Pacific, Australia is characterized by sophisticated service providers and end users with:

- High level of server virtualization creating the right foundation for delivering cloud services;
- Great propensity for IT outsourcing;
- Shortage of IT labor and need to complement in-house IT team; and
- Shift in IT spending from one based on capital expenditure (CAPEX) to an operational expenditure (OPEX) model as a result of the global financial crisis (GFC). This model is fast-becoming a defunct delivery model despite Australia's recovery from the crisis.

Australian enterprises are leveraging cloud services to increase their speed-to-market for new products and services and to increase competitiveness. This is especially evident in the banking sector – a strong proponent of cloud services – and supplemented by the need to provide flexibility to meet business demands (peaks & troughs) via real-time/on-demand computing. Prime examples include Commonwealth Bank of Australia and National Australia Bank. The former is a strong advocate of Amazon's Web Services among the other service providers it uses since the launch of its local data center, while the latter is working on a consumption-based payment model with its two key service providers IBM and Telstra.

Data security threats and risks to the business, however, continue to be primary concerns for cloud adoption in Australia. When accessing applications via the cloud, Australian enterprises value security and availability the most. Australian enterprises have significant investments in legacy infrastructure and existing IT outsourcing agreements on a fixed price basis which moderate the pace of adoption as reflected in their lower benchmark scores. Having moved most of their non-core and several core applications, Australian enterprises are currently reassessing future steps before investing further in cloud computing. Australia's international connectivity is another major roadblock hampering the adoption of cloud services that are more global in nature. Frost & Sullivan expects the adoption to continue at a moderate pace as applications and infrastructure come to the end of their lifecycle and get replaced by hybrid cloud services.

China

The highly-regulated communications market in China is a significant restraint in creating a competitive landscape for cloud computing. The state-owned telcos' domination of the telecom infrastructure and bandwidth has effectively suppressed competition as private data centers must rely on local telcos for bandwidth. The state-own telcos are leading the first phase of cloud computing in the country. The potentially large-scale opportunity is attracting global market participants to enter the market, albeit in partnership with local participants. Foreign cloud services companies such as Amazon Web Services, Microsoft and IBM are all competing for a slice of China's cloud computing services market.

Given the robust activity, cloud computing education and knowledge levels are improving rapidly in the country with the highest percentage of enterprises rating themselves as "very knowledgeable" in understanding the differences between the three types of cloud services (public, private and hybrid). There is a positive correlation between knowledge and prioritization levels of cloud services in China with 77% of enterprises stating that cloud computing is their #1 priority for the

next 12 months. China leads cloud adoption in the region, with 78.6% of Chinese enterprises either currently using or in the process of implementing cloud services; only 1.4% of respondents indicate no plans to use cloud at the moment.

In terms of cloud adoption, China has the largest number of enterprises (55.1%) looking to leverage cloud computing to complement their existing capabilities. A crucial factor behind this is the limited investment in legacy infrastructure, and even where there is investment most software is relatively new. Enterprises in China are replicating successful business models in the West by leapfrogging technology cycles and emerging as key market participants on a regional and global scale. Prime examples include the success stories of Alibaba, Baidu and Tencent. To date, Alibaba has capacity that can rival some of the leading pure-play cloud service providers. While this momentum is largely driven by the Chinese government's efforts to use cloud services for its own consumption, another major factor is the massive, connected and technologically-savvy population.

When it comes to the challenges for cloud adoption, the ranking for data security threats/risks to the business is relatively low. A unique challenge in China is the lack of awareness/buy-in from senior management on the real benefits of cloud. Moving forward, 62.6% of respondents expect the cloud computing budget to increase more than 5% in 2015 compared to 2014. The 12th Five-year plan plays a critical role in instilling confidence in cloud spending, with the government announcing significant investments in creating a cloud computing infrastructure and platform, primarily in the Northern part of China.

Hong Kong

Hong Kong is one of the two major data center hubs in Asia-Pacific and houses the data centers of cloud service providers such as BT, CenturyLink, Google, Microsoft, Rackspace and Verizon. Close to one-fifth of organizations in Hong Kong are using cloud computing in one form or the other, with another 75% either in the implementing or planning stage of adoption. Hong Kong has long been considered a gateway for Mainland China enterprises to expand globally, and for global businesses looking to tap into opportunities in the Greater China region, driving significant demand from both these segments of end users.

The government is also an end user of cloud computing in Hong Kong. It has proposed a cloud environment that includes an in-house private cloud owned and operated by the government; outsourced private clouds comprising facilities dedicated to the government in secure data centers operated by contractors; and public clouds for generic services where the government has less control over how the services are provided, according to a government statement. The government cloud will be made available for shared use by all bureaus and departments so they can execute their own IT-enabled business change initiatives in a more agile, cost-effective and joined-up manner. This enables flexible deployment of IT resources and workloads, and helps to reduce the overall carbon footprint and environmental impact.

The banking and financial services is an important vertical in Hong Kong, and one that is taking a wait-and-see approach to cloud computing. While virtualization is widespread among market participants, public cloud adoption continues to be low given their concerns about regulatory compliance and data security and privacy. However, most banks are keen on the private cloud model which helps alleviate these concerns. This model is witnessing widespread adoption as

they add cloud-enablement tools on top of virtualization to enable resource optimization and drive business agility. Frost & Sullivan expects this industry to move to a hybrid IT model over the next five years as the regulatory framework evolves along with the maturity of service providers to enable customer data (database) to reside in a private environment and run the applications off a public or a multi-tenanted environment.

Besides resource optimization and cost-savings, enterprises in Hong Kong are also looking to use cloud computing to avoid vendor lock-ins, a standout response in comparison to the other countries in the study. In terms of factors inhibiting adoption, data security threats/risks to the business are ranked highest. When accessing applications via the cloud, Hong Kong enterprises rank the availability of applications highest among various attributes. Another factor being closely watched by international cloud service providers in making new investments is the influence of Mainland China on Hong Kong with the impending 2017 elections. This may lead to a slowdown in some of the current plans as enterprises may take a wait-and-see approach before making any local IT spending decisions.

Japan

Japan is the largest cloud computing market in the Asia-Pacific region. Openness to adopt third-party hosted solutions, like SaaS and IaaS is highest in Japan. This can be attributed to its comprehensive privacy protection laws that do not inhibit commerce, a full range of criminal and intellectual property protections, and robust IT infrastructure. Japanese enterprises show a high degree of polarization towards cloud knowledge development, with 11.4% of respondents declaring that they have no knowledge about the differences between the different types of cloud services; while on the other end, a high percentage of respondents (32.9%) are extremely knowledgeable.

Likewise, cloud adoption in Japan is also polarized. Nearly 71.5% of Japanese respondents are either currently using, or in the process of implementing cloud services; while 15.7% of respondents indicate no plans to use the cloud at the moment. Due to the sizeable market demand, cloud service providers in Japan are ahead of the rest of the region in terms of solutions maturity. Japanese providers are now competing to create customized services to suit their clients' requirements and portfolios.

While the Japanese government is one of the biggest adopters of cloud computing, BFSI, retail and the IT industry have been increasingly adopting cloud services as well. NTT Data recently introduced one of the first community clouds in the world with its core banking solution – BeSTA (Banking application engine for Standard Architecture) which is currently being used by more than 20 local banks in Japan. Yahoo! Japan, which was the first to implement its own OpenStack-based private cloud in the country, has now launched cloud services through its local subsidiary IDC Frontier which is emerging as one of the leading cloud service providers providing cloud infrastructure services to meet the needs of Japanese enterprises.

As a result of the catastrophic effects of natural disasters, Japanese enterprises are extremely cautious about their business continuity/disaster recovery plans. Even during the massive natural disasters in Japan, the data center services industry escaped relatively unscathed, with a large number of data centers sustaining minimal damage and remaining up and running. This has

established the qualitative stability of vendors, resulting in expanding service portfolios and client trust.

In comparison to the other countries, Japan has the largest proportion of enterprises (32.2%) that have reached the third stage of the cloud adoption roadmap, which is using cloud to enhance organizational capabilities. Availability, performance and scalability are the top three essential attributes ranked by Japanese enterprises when accessing applications via the cloud.

Singapore

Singapore is a huge beneficiary of the cloud computing boom in the Asia-Pacific with several Tier-1 cloud computing service providers such as Amazon, Microsoft, Google and Salesforce.com housing their data centers in the country. Due to recent investments in high-speed Internet and broadband, Singapore is well-positioned to take advantage of cloud computing services. The highly developed broadband infrastructure and presence of data centers have helped the Republic to circumvent two of the biggest challenges other countries face: data sovereignty and latency. Almost 40% of organizations in Singapore are using cloud computing; while more than 35% are planning or implementing cloud strategies.

For Singaporean enterprises, facilitating resource optimization and enhancing internal business processes are the top two factors driving cloud adoption as demonstrated in most of the examples of cloud adoption. Aviation industry participants such as Changi Airport Group (CAG) and SATS have been using cloud services to enhance their business processes. CAG uses a cloud-based CRM system to manage its increasing call volumes better while managing costs and operational efficiencies, while SATS uses cloud computing to run a range of IT applications ranging from e-mail, collaboration to resource and cargo management. Like Australia, Singaporean enterprises consider data security threats/risks to the business as primary concerns for cloud adoption. This is a key measure of the country's maturity in terms of cloud adoption.

Apart from providing incentives to small businesses to stimulate the growth of cloud computing, the Singapore government is actively looking to embrace the cloud for its internal usage. It has set up a G-cloud to operate central services such as government web service exchange and gateways to Sing Pass and e-Payment services. To further aggregate whole-of-government demand to maximize cost-savings, the Government plans to identify and provide common services such as customer relationship management and web content management, as software-as-a-service offerings on G-cloud.

South Korea

South Korea has maintained its early adopter status in emerging technologies in cloud computing as well. It is the first country to enact a cloud computing act, known as "Act on the Development of Cloud Computing and Protection of Users". Among others, the Act promotes the adoption of cloud computing in local and central government and public institutions. It also provides guidelines and policies to manage key issues such as disclosure, quality and performance of the services supplied by cloud service providers; and measures to enhance the country's competitiveness in the cloud computing industry. The Act is expected to be effective September 2015.

According to the survey, 95.7% of enterprises are either "highly-knowledgeable" or "somewhat knowledgeable" about the different types of cloud services. This is significantly higher than all the other countries. More than 28% of enterprises are using cloud services, while 65% are in the planning and implementation stages. Most South Korean enterprises are looking to leverage cloud services to focus on core business competencies and engage customers effectively. Conversely, traditional cloud benefits such as cost-saving and on-demand features are no longer key considerations for South Korean enterprises leading to a significantly larger number of private cloud implementations compared to other countries.

Another key characteristic in South Korea is higher spending with local cloud service providers in contrast to most other markets in the Asia-Pacific region where spending is with global or regional cloud service providers. In South Korea, approximately 50% of cloud spending is with local cloud service providers across SaaS, IaaS and PaaS due to the preference for localized and customized solutions, especially for the private cloud model. Key players include Korea Telecom, LG U+ and SK Telecom. These are followed by ISVs that offer SaaS solutions such as 00DBM, Ecount and Daou Technologies.

Most enterprises that hesitate about cloud adoption highlight data security and privacy as main stumbling blocks. Customers are also concerned about the availability of services they migrate to the cloud. Service providers are attempting to address the concerns of prospective customers by providing them with IT consulting and road mapping services before they embark on their journey to the cloud.
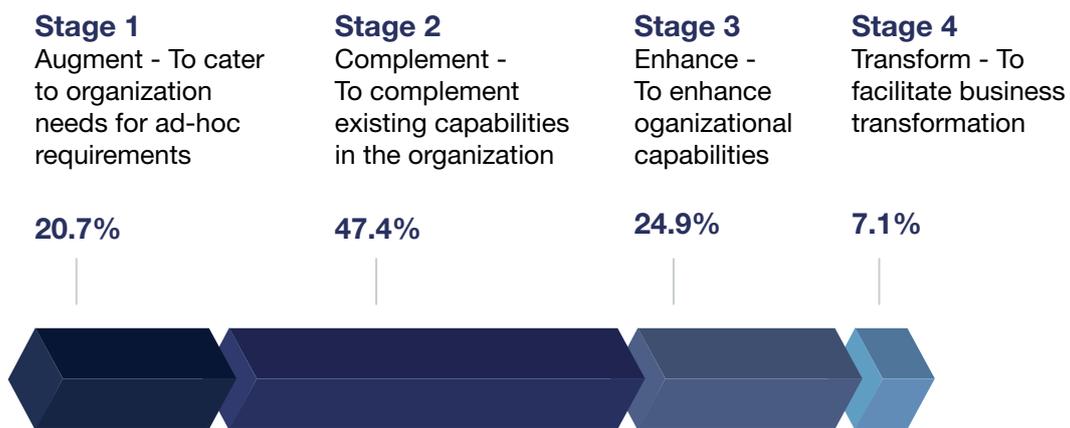
THE FUTURE OF ORGANIZATION – TRENDS AND IMPLICATIONS

Having established the framework to outline the characteristics of the "new language of cloud computing", it is essential to understand the other trends and challenges that define the organizations of the future.

From Optimization to Automation

The survey reveals that a large number of enterprises (68.1%) are still in the preliminary stages of planning and implementing cloud strategies. This reflects the primary use of cloud services to cater to ad-hoc business requirements or complement existing capabilities in the organization, as a way to optimize and streamline conventional business processes. Moving forward, Frost & Sullivan expects this to change.

Figure 9: Organizations' Current Stage on the Cloud Adoption Roadmap

Stage 1
Augment - To cater to organization needs for ad-hoc requirements

20.7%

Stage 2
Complement - To complement existing capabilities in the organization

47.4%

Stage 3
Enhance - To enhance oganizational capabilities

24.9%

Stage 4
Transform - To facilitate business transformation

7.1%

Source: 2014 Frost & Sullivan Cloud User Survey

Aggressive enterprises are expected to leverage cloud computing to automate business operations and drive business transformation. As cloud services are made to create the illusion of an infinite resource pool, with intelligent, real-time monitoring and managing systems, enterprises will be able to manage the automated environments more efficiently.

To facilitate the move, emerging technologies such as the Software-Defined Everything (SDE) are best suited to meet these demands. In the SDE vision, the management and control of networking, computing, storage and/or data center infrastructure are automated and managed by intelligent software, instead of being manually configured at the hardware layer. This way, all infrastructure resources can be delivered as a service. As a result, internal IT will be able to increase its focus on the businesses' core competencies, look to rejuvenate their business model and drive new business economics.

Integrating Business and IT for a Collaborative Decision-Making

At an organizational level, more collaborative decision-making is expected to become the new norm when it comes to cloud services procurement as IT goals align with business missions, replacing the silo decision-making process.

To respond to these changes, the role of the IT department and CIO should also evolve. CIOs need to work closely with business partners, and ensure that all technology deployments are in line with the organization's business objectives, and vice versa. The decision-making process also needs to be streamlined in a unified and efficient manner, aiming to maximize the benefits of cloud and creating a competitive advantage for the organization. Additionally, the role of the CIO is set to shift from "Information" to "Innovation". For example, a CIO of an eCommerce retailer is likely to focus on ways online shopping can become a more rewarding self-service experience and how to integrate multiple channels to the customer.

No More IT Silos, Just Real-time Information Sharing

Traditionally, most enterprises manage IT resources, such as storage, network and server, as well as their corresponding IT functions in silos. This results in higher costs, integration complexities, duplications and other potential risks. To ensure an organization's IT deployment keeps up with business needs, enterprises must find ways to bridge the gap between IT silos and allow a fluid flow of data. Ultimately the entire portfolio of an organization's IT resources will run under the shared information architecture, and IT functions can work in real-time information-sharing environments.

For enterprises with hybrid IT infrastructures, it is even more critical to prevent IT silos. Databases should be integrated between on-premise applications and also between on-premise and cloud-based applications, to enable a seamless operation and enhance application performance. A solution that offers real-time insights on the overall IT environment performance across various infrastructures should be in place as well.

Enhanced Customer Experience with Assured Security Measures

With the inclusion of customers in the IT user pool, the customer satisfaction level is potentially a key performance indicator (KPI) for IT departments in the future. However, today's customers are far more impatient. For instance, online shopper's website abandonment rate highly correlates with the page loading time; the average expectation time at two seconds or less from four seconds previously.

To enhance the customer experience, the availability and performance of business applications are crucial – as indicated by the survey results where 8 in 10 respondents chose both attributes as being most important when accessing applications via cloud.

Cloud service providers could benefit from embedding quality application delivery service and application performance management services in their cloud-based application offerings, while assuring security measures are in place.

CONCLUSION: WHAT DOES IT MEAN FOR ENTERPRISES?

In order to control costs and manage IT assets more efficiently, enterprises are increasingly optimizing and automating their resources by adopting virtualization and cloud computing. Service providers are responding to this need by introducing mature services and processes to manage the ever-complex ICT environments. With the cloud model rapidly evolving and its benefits being well documented, the "new language of cloud computing" is here to stay and develop further.

Enterprises are seeking benefits from cloud resources that are centered on agility, flexibility and scalability. This is expected to give rise to a future dominated by an all-encompassing Everything as a Services (XaaS) IT environment. XaaS is predicted to significantly "disrupt" the way technology is consumed and inspire business model innovation. The low-risk nature of these services is likely to encourage experimentation, and ultimately transform whole industries.

Frost & Sullivan projects that the XaaS model will become a natural progression for most enterprises as they embrace outsourcing and cloud computing. Enterprises need to:

- Align their IT adoption with their business and technological requirements;
- Ensure greater collaboration between business and technology to eliminate "shadow IT";
- Assess their security and compliance requirements when moving to an all-encompassing services stage; and
- Progress beyond consolidation and optimization to automation to focus on their core activities.

Service providers can help enterprises to benefit fully from XaaS and hybrid cloud infrastructures by delivering enterprise-grade, end-to-end management services. Service providers with stringent, enterprise-grade security and privacy standards in standalone or incorporated in the cloud model, are likely to gain a competitive advantage to tap into more opportunities now and in the future.

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About F5 Networks Inc.

F5 (NASDAQ: FFIV) provides solutions for an application world. F5 helps organizations seamlessly scale cloud, data center, telecommunications, and software-defined networking (SDN) deployments to successfully deliver applications and services to anyone, anywhere, at any time. F5 solutions broaden the reach of IT through an open, extensible framework and a rich partner ecosystem of leading technology and orchestration vendors. This approach lets customers pursue the infrastructure model that best fits their needs over time. The world's largest businesses, service providers, government entities, and consumer brands rely on F5 to stay ahead of cloud, security, and mobility trends

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