Verizon Response on ACCC Market Study

Introduction

We are pleased to submit our response to the paper titled "Competition in evolving communications markets" issued on 5th September 2016 by Australian Competition & Consumer Commission ("ACCC"). The subject matter of the paper is important and timely, as innovation combined with technology has brought to the market new service formats and offerings for consumers, increasingly sophisticated networks and service platforms and, important for the purpose of this consultation, the need to balance the interests of all the stakeholders to assure competition and continued flow of investment and innovation.

About Verizon: Verizon is a global player. Outside of the US, Verizon provides a broad range of global communication products and enterprise solutions, predominantly to large business and government customers. Verizon Australia primarily provides transport, IP, security and IT services and solutions to large enterprises who have global presence as well as to entities within government and wholesale sectors. Verizon has operated in the Australian market via various vehicles since 1998. In all countries, including Australia, we generally welcome any initiative that aims to facilitate innovation and growth in an atmosphere of healthy competition through harmonization and legal certainty, while reducing administrative burden. We provide a response to specific issues raised by these sections:

Section 4: Consumer Trends and Issues
Sections 5 & 8: Emerging Services
Section 9: Core and transmission networks and services
Summary of Policy considerations

Section 4: Consumer Trends and Issues

We understand that one of the key drivers for initiating the market study is the increasing adoption of technology by the Australian consumers to meet their evolving communication needs across more devices and platforms than ever before. The increased proliferation of ICT services has also led to affordability, more choice to the consumer mainly as mass market residential users. With the changing market landscape, ACCC is interested to understand:

- Whether there are any impediments to competition in communication markets delivering benefits to consumer in terms of quality, availability, affordability and choice of competitive product offering?

- How consumer preferences for communications products/services are changing and whether this has any implications for the communications markets?

Verizon Response:
We would like to bring out an important element in the discussion on consumer trends and issues. As rightly noted by ACCC in section 4.4 and developed below, the needs of the consumer mass business users and enterprise business users are different in terms of both contract and the service needs. This distinction between residential services (sold to consumers) and non-residential services (sold to (large) business customers) needs to continue to be explicitly recognised. Indeed non-residential enterprise business services should be exempted from consumer regulation wherever possible.

The diversity of business service providers and customers (e.g., differing contract provisions and business needs) in the Internet and communications space means that competition and other consumer mass business regulations serve little purpose and, more importantly, create the substantial risk of disproportionately impacting innovation and investment if applied to business service providers. The reasons for exclusion of enterprise services are multi-fold:

- the marketplace for these services is well-functioning and highly competitive;

- enterprise services are typically sold to individual customers and are often contracted on an individual case basis; consumer services are not individualized (other than through common differentiated service offerings) and are not offered through customized or individually negotiated agreements;

- the nature and types of services themselves are radically different in the enterprise space as noted by ACCC in the study paper. Unlike mass-market consumer services, large business and enterprise services present various specificities that differentiate them from mass-market services which are significantly more complex (e.g., telecom services provided and multiple locations across countries, different access technologies, bundles of services, demanding Service Level Agreements (SLAs), to name just a few);

- enterprise customers can take care of themselves and they typically have sophisticated knowledge of the technology and economic implications of the services they are buying;

- consumer protection obligations relating to the required quality levels, transparency, technical characteristics, and penalties for noncompliance, are already addressed in large part in contracts. Thus, the extension of consumer protection obligations to the high-end enterprise market is not necessary and should be avoided.

We note that the regulators and policy makers worldwide have continued to exempt specialized/enterprise services from any prescriptive regulation and have also recognized the benefits of the differentiated approach in the digital economy.

Recommendation: Light touch approach that enables continued flexibility for offering differentiated enterprise services the marketplace for which is well-functioning and highly competitive.

Section 5 & 8: Emerging Services

ACCC has noted in section 5.1 that Australian consumer and business are readily adopting new ways of communicating and utilizing new online platforms and content services offered by Over the top (OTT) services. These emerging and developing trends have implications for network operators and traditional communications service providers. Below is the combined response to related questions no.7-12 with respect to OTT services at pg. 27.

Verizon Response:

Over the top services (OTT)

This century has been characterised by the rise of the OTT players – which are typically distinct from the network provider – meaning that the application and network layers have separated and OTT providers deliver their content, applications and services like voice/video/messaging directly to end users over third party networks. Even better for the OTT players these networks used to deliver their services, the transport, is typically paid for by their end users. While there is no doubt that the OTTs are disruptive in nature, there is much doubt as to what the market regulatory response should be. Like all disruptive forces there will be those that resist the change and cry foul on competition and those that embrace it. Verizon questions whether the transformative technological evolution that is the Internet and its related innovation would benefit from simply and incrementally imposing existing sector specific regulation on new OTT services. Given the realities of today's digital market dynamics any regulatory approach should (i) shift away from sector specific regulations towards generic horizontal rules; and (ii) only apply regulation where necessary and proportionate and to all market participants equally, with a goal of lightening regulation to reflect increased cross-sectorial competition. The high-level policy principles and existing tools in competition law and consumer protection are sufficient to protect against demonstrable unlawful behaviour. The standard for intervention should be demonstrated harm to competition or to the consumer.

We further note that the market study at section 5.12, seeks to examine implications of the emergence of OTT services on the current economic regulatory framework for the communications sector. The Internet has become the most powerful communications medium and engine for economic growth ever, and has achieved this unprecedented growth without prescriptive regulation that would have locked in place certain specific technologies or business models. In considering any regulation to be adopted in the

future, policy-makers should optimize not only the policy of Internet openness, but also the need to maintain incentives for service providers to continue investing and innovating in the rapidly evolving advanced networks that must keep pace with the diversity and volume of new services.

Recommendations: To the extent that any regulatory intervention is found to be necessary, it can be effective if appropriately targeted and limited to the adoption of meaningful transparency requirements, and the prohibition of blocking, degrading or otherwise unreasonably disfavouring some Internet traffic over other Internet traffic.

Data traffic management

The questions addressed in the issues paper mainly aim at protecting the consumer as a mass market/residential user. There are many reasons why business services should be excluded from data traffic management obligations, mainly that businesses not only have bi-laterally negotiated tailor made contracts that are different from consumer contracts but businesses also require and demand different services than those used by consumers. Although in general Verizon does not use traffic management measures for our stand alone internet access, the need for traffic management to ensure an efficient use of the private corporate network is a key feature of these services that is fully driven by what customers demand for their individual solutions.

Recommendations: Exclude business services from any data traffic management obligations.

Internet of things & Machine to Machine communications (IoT & M2M)

M2M technologies and the IoT represent the next leap forward in the evolution of Internet-based services by connecting machines, devices, and industries to improve delivery of services and process management to increase efficiencies. Machine-to-Machine (M2M), a distinct segment of the IoT, is revolutionizing business processes. By being able to deliver actionable data fast, it can help enterprises speed decision-making, streamline supply chains, understand customer demands, and bring new products to market quickly. According to industry estimates by 2017, there will be nearly three networked devices for every person on earth.

Specific to issue raised at question no. 21 of the study we would like to underscore that the IoT & M2M ecosystem involves a large number of players; a range of platforms, device formats, and services; and data of varied sensitivity. The policy framework including any competition or consumer protection aspects should reflect this diversity and should not vary depending on the type of device or technology used to collect or transmit data. Instead, a framework should be technology & location neutral and apply in a way that is proportional to the nature, sensitivity, and amount of data collected. In addition, any framework should be flexible that promotes technological innovation , principle of opening up the sector, aligning with global best practices, embracing technological changes and promote light touch regulation.

Recommendations: To promote global innovation and investment throughout the digital economy, ACCC to adopt the following policy objectives to ensure adoption of IoT and M2M is not inhibited:

- Encourage and foster cross border data flows, develop standards that will not impede adoption of M2M technology and foster the development of technical standards that are easy to adopt cross-sector, (such as standards that may be needed so that any M2M device can connect to any network);

- Make sure the technology neutrality principle permits a broad range of complex integrated services and value chains to reap the benefits of favourable trade rules;

- Be wary of classifications – historic or new – that could freeze commitments and quickly make them obsolete;

- Both promote competition, and rely on it wherever possible, rather than on rigid regulatory rules;

- Avoid unnecessary regulations that could impede the pace of innovation and find mechanisms to address divergent national standards.

Section 9-Internet Interconnection, Cloud Computing, SDN Networks

Verizon Response:

Internet Interconnection

In response to the Core and transmission network and Services Chapter of the Study, Verizon would like to pay particular regard to the Internet Interconnection section.

In response to q64 Verizon submits that industry developments have resulted in changes to both the nature of and the players in internet interconnection arrangements since the last review in 2003/4. In its response then Verizon was of the view that the interconnection market was driven by the goal of universal internet connectivity and arrangements were put in place to achieve that goal. Similarly the concepts of value that underlay those arrangements were also derived from that goal.   Now although universal internet connectivity remains a fundamental goal for network service providers (service providers) to achieve via internet interconnection factors including the:

(a)   addition of non-ISP players in the space; and
(b)   features of availability and delivery of content;

are leading to that goal being nuanced. That is the rise of OTT players, the general redistribution of internet content sources plus the increasing participation of content distribution networks (CDNs) have all contributed to an internet interconnection playing field in 2016 that has significant variances from the past.

Interconnection relationships are being shaped today by these factors which result from the shift of the creation, control and location of content from the service providers to the likes of Google, Twitter, Microsoft, LinkedIn, Amazon and many more. In addition due to the critical need to satisfy customer demand for an excellent user experience both as to availability and delivery of content we now see content distribution networks (CDNs such as Akamai, Verizon Digital Media Services (VDMS), Limelight) involved with almost all large content resources to ensure the required optimal content availability and distribution efficiency. As noted these new dynamics within the interconnection market not only change the players within the arena but also the ways in which interconnection is achieved.

Although at a high level there is still an overarching goal of universal Internet connectivity, this is tempered by a condition as to the nature of that connectivity – that is the connectivity must also provide optimal user experience. The achievement of this goal has led to a shifting or consolidation of the concept of what value is – combining infrastructure investment, content creation and eyeballs as key. This expansion of the value proposition has led to both a diversification of the interconnect relationships formed, plus a diversification of players in the marketplace that wish to form these relationships. New players (and old) participate in an extremely competitive environment for eyeballs which when coupled with the end user online experience expectation drives new and varied interconnection relationships and commercial outcomes. In other words the "interconnect agreements" of earlier this century being between service providers are being supplemented with interconnection between content networks (Like VDMS) and content hosts (like Google) and the eyeball networks (like Telstra, Optus and Verizon). The perceived value in these relationships – the mutuality and the like will vary enormously. As such in Verizon's view the interconnect agreements between service providers are not as centrepiece they were years ago, because content networks and hosts are seeking direct connectivity to eyeball networks from a capacity and performance perspective and basically bypassing transit of service providers.

A service provider may still conclude an interconnection relationship in a variety of ways. There is a vast range of commercial transactions, ranging from simple barter transactions to a broad range of monetary exchanges, with every imaginable variety of discount and price adjustment based on terms, volumes, extent of route announcements, the nature of the service providers, the nature of the content on each network, and other factors determining the value of the traffic exchanged. The terms of interconnection arrangements factor in both the costs of traffic carriage and the range of relative value criteria beyond mere traffic flow.

The value inputs in each of these parts of the interconnection market vary. In assessing competition it must also be remembered that 'value' is a complex concept in the interconnection world of which cost is merely one factor. Value is exchanged in the interconnection market in ways other than cost and great care is required in ensuring the consistent use, definition and quantification of the values inherent in particular

types of connectivity arrangements so as to be sure that the competition assessment is appropriate and sound.

Content rests more predominantly with non-service providers. Many service providers have no content apart from the traffic to and from 3rd party content sources. As such content providers are part of the interconnect landscape now in their own right – with arrangements being put in place directly between service provider and content source for traffic travelling to and from that service providers' customers to that content source. Lastly the CDN players have similarly entered the discussions to secure their relationships that will allow CDN customers (and their eyeballs) to connect to that content in the most optimal fashion.

Lastly and most importantly Verizon would like to emphasise that among the varying interconnection options available today settlement free peering which seems to form a large part of the focus for the ACCC is only appropriate where each network sees the other as providing value by simply carrying/delivering its traffic. So for example if a service provider (Network 1) has many content providers and enterprises connected to its network, and many consumers ("eyeballs") on that network as well, that provider would generally only see value in a settlement-free arrangement where the other network (Network 2) is similarly situated—meaning, they have many content-sources and many content-consumers. In other words the value lies in the fact that Network 1 will carry traffic that Network 2's content sources are trying to send to Network 1's content consumers.

Where there is not such mutual value present, settlement-free becomes simply "free." And as a service provider that has invested heavily in its network both in Australia and globally we cannot give service to anyone for free.

With specific reference to the question raised in the market study:

Query: Whether current interconnection arrangements between Telstra, Optus, TPG and Verizon, and smaller service providers are inhibiting more efficient practices, technologies, etc?

Response: Verizon has generally been able to obtain interconnection on commercially reasonable terms. Some network operators are easier to deal with than others, and offer better terms than others. As technologies, traffic patterns, customer use of the Internet, and Internet content distribution continue to evolve, it is imperative that network providers remain flexible and open-minded with respect to establishing and maintain interconnection on commercially reasonable terms and conditions so that customers' demands for high quality online experiences can be met in the most efficient manner possible. Verizon is of the view that it is successful in this endeavour.

Cloud Computing and Data Centres

ACCC notes the benefits of cloud computing to consumers and business including the ability to access data remotely from mobile and smartphone devices. Verizon's recently published cloud report titled "State of the market: Enterprise Cloud 2016" (attached as Annex-1) provides interesting insights on the benefits of expanding use of cloud computing services. The report finds that 94% of companies expect more than a quarter of their workloads to be in the cloud within two years. The cloud is now business as usual, with companies using it to transform themselves and build a sustainable competitive advantage. There are interesting data points that emerge from this report, including:

- 69% of enterprises confirm that cloud has helped them significantly reengineer their business processes
- 77% of enterprise view cloud as giving them a competitive advantage
- 84% of enterprises indicate their use of cloud has increased significantly
- Financial benefits outside of potential cost savings are significant with 40% of enterprises saying it has increased their revenue and 36% saying it has increased their profit margins

Cloud is now an integral part of enterprise IT and enterprises are looking for cloud solutions that will help make their businesses more efficient, agile, responsive, and competitive. Because every organization has different needs and objectives, enterprises are demanding solutions that address their particular needs. Tired of "one size fits all", these organizations are looking for solutions that will make them more competitive, control costs, improve customer satisfaction or grow faster.

Organizations are using the cloud to create new customer experiences, re-engineer their business processes and find new opportunities to grow. Advances in technology are changing the cost-benefit equation and making it easier for companies to build more powerful environments in the cloud, enabling them to move more workloads and transform more processes.

The report can be accessed online at:

http://www.verizonenterprise.com/resources/reports/rp_state-of-the-market-enterprise-cloud-2016_en_xg.pdf

The ACCC seeks to examine a number of issues at Qno.83-86 related to control over data, cross border data flows and other inputs that could be used to impede entry and completion or impact on the investment in the cloud computing or related markets.

Seamless flows of information across borders are essential to growth throughout the global economy, since services, manufacturing, and even agriculture increasingly rely on digital communication and other data transfers. Regulatory frameworks should avoid and eliminate barriers to these data flows. Further the regulatory framework should be such that it enables the service suppliers of other countries, or

customers of those suppliers, from electronically transferring information internally or across borders, accessing publicly available information, or accessing their own information stored in other countries.

In this regard, it is important that the institutional framework to access data in other countries should be based on mutuality and reciprocity, such as through mutual legal assistance mechanisms. The scope of bilateral agreements may be enhanced for sharing information based on principles of transparency and accountability. Finding a balance is important if the full benefits of international trade in goods, services and e-commerce are to be realized by reducing unnecessary costs of doing business. Transparent and efficient mechanisms based on the rule of law are critical to building trust between countries in this area.

We note that this principle was recently upheld in the United States where a court ruled that law enforcement authorities cannot compel a U.S.-based company to turn over the data of a non-U.S. citizen for data held outside of the United States. Please see Verizon's public policy blog on the decision at:

http://www.verizon.com/about/news/verizons-transparency-report-microsoft-case-and-icpa

The Asia Cloud Computing Association ACCA commissioned a study called The Impact of "Data Sovereignty on Cloud Computing" to analyse the implications of data sovereignty law and policy on the adoption of cloud computing-based infrastructures and services in Asia. By reviewing and analysing data sovereignty regulations in 14 countries in this study, the Association identified potential bottlenecks that could slow adoption and threaten Asia's digital future. The research was compiled across 14 Asia Pacific countries (Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam) using information on data sovereignty factors that helped or hindered the adoption of cloud computing. Each country was assessed on five key assessment criteria:

(1) Cloud access,
(2) Data safety,
(3) International consistency,
(4) Cross border movement, and
(5) Regulatory stability and enforcement.

The report's scorecard shows a widening "cloud divide" – the gap in cloud adoption between developed markets such as Australia, New Zealand, Japan, and Singapore, and emerging markets such as China, Philippines and Vietnam.

Japan (80%) ranked top on the ACCA Data Sovereignty Scorecard for its ability to move data across borders, having a stable legal environment consistent with global norms, ahead of New Zealand (79%), Singapore (78%) and Australia (76%) with China propping up the region on 46% behind Vietnam (48%) and the Philippines (59%)

The ACCA analysis reveals that the biggest challenge to cloud computing adoption in Asia is the lack of regulatory consistency across the region and consistency with global norms on data privacy and regulatory oversight.

http://www.asiacloudcomputing.org/research/datasovereignty2013

Software Defined Networking: Trends on the adoption of SDN/NFV technologies likely to impact competition in communications industry?

We believe that SDN and NFV are important developments that will definitely have an impact on future wholesale access products for the provision of connectivity services, especially for (cross-border) services to businesses. They will indeed make network provisioning simpler, more cost-efficient, flexible and secure both for the providers and their customers.

A good example is the Multi Service Edge (MSE) that combines multiple services (Private IP, Internet, E-Line and E-LAN) on a single Edge device. The MSE may use SDN/NFV functionality with centralized control plane and Virtual Network Functions. The MSE will be a key component in enabling automated and dynamic provisioning. Some components of the MSE concept are in production today but full functionality is likely a few years out.

Although with developments such as SDN and NFV the number of stakeholders (hardware vendors, integrators, service providers, etc.) with sometimes diverging interests increase, the standardisation process should indeed continue to be primarily market driven. With services becoming increasingly global in nature we need to avoid situations where regional standards are mandated or even prevail over international standards. Rather than just relying on national or local standards, relevant authorities should actively engage in global standardization forums. The global development of technology has benefitted from policies and regulatory approaches based on the principle of technology neutrality, which has let the market decide which technologies succeed or fail.
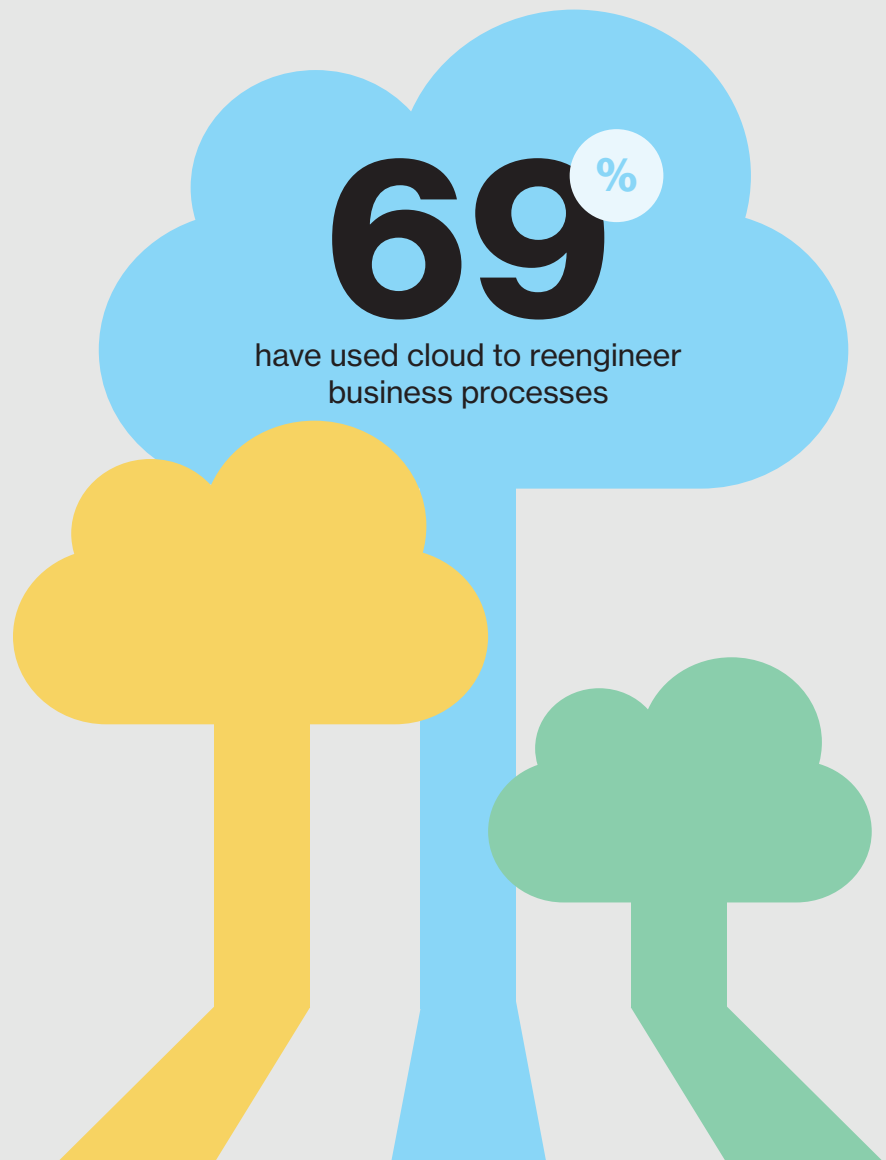
4 November 2016

Annex – 1

State of the market: Enterprise Cloud 2016

State of the Market: Enterprise Cloud 2016.

From adoption to transformation.

verizon✓

69%

have used cloud to reengineer
business processes

The evolution continues. Last year the news was that cloud was being used for mission-critical workloads. Cloud's now firmly established as a reliable enterprise workhorse, and what's most interesting is how it's driving transformation. Organizations are using cloud to create new customer experiences, reengineer their business processes and find new opportunities to grow.

Sources

In writing this year's report, we've drawn on multiple data sources:

- Verizon reports: including last year's *State of the Market: Enterprise Cloud 2014* report.
- Verizon customer survey: survey of Verizon's enterprise-level cloud customers (October 2015).
- Verizon-commissioned research: Harvard Business Review Analytic Services report *Cloud: Driving a faster, more connected business*, commissioned by Verizon (2015).
- Third-party research: studies from Forrester Consulting, Gartner and IDC to add additional perspective to our findings.

Contents

From adoption to transformation.

In the three years we've been producing this report, we've seen cloud go from a newcomer to part of the established order. But despite the maturity of cloud, the market is still developing and most organizations are still finding new and exciting ways to take advantage of it.

In last year's enterprise cloud report[1] we talked about how cloud was redefining the role of IT. That's proceeded apace. In many organizations the IT function is now much more closely aligned with the lines of business (LOBs) and is adept at managing a portfolio of cloud providers.

Companies are combining public, private and on-premises infrastructure to create highly sophisticated, customized environments. These environments can provide the ideal mix of performance and flexibility. This can enable even the most established organization to do things in new ways, and disrupt even the most entrenched industry.
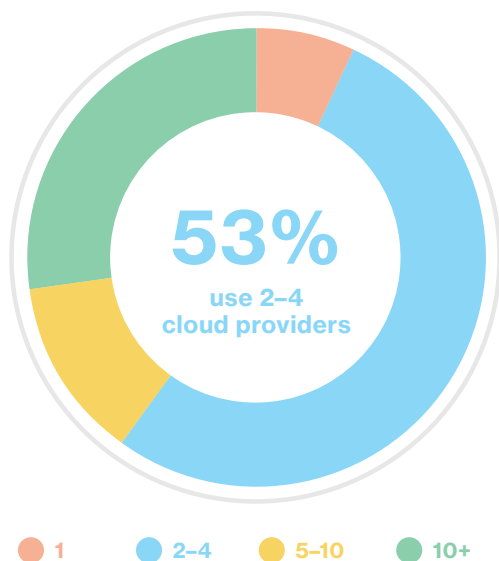

53%
use 2–4 cloud providers

● 1   ● 2–4   ● 5–10   ● 10+

Figure 1: Number of cloud providers[2]

It's not just IT functions that are changing, cloud providers are too. Sophisticated new services and powerful new tools are making it possible for even the largest, most ambitious organizations to put their whole infrastructure in the cloud and transform their business.

69%

say that cloud has enabled them to significantly reengineer one or more business processes[2].

We've seen lots of change, but there's more to come. In this paper we'll discuss:

- How cloud use is growing more sophisticated.
- The importance of cloud in digital transformation.
- The three different personas that are emerging.
- Ways in which cloud is being incorporated into IT strategic decision-making.
- How organizations are looking to managed services to make the most of cloud.

So what's the state of cloud today? Read on.

In just a couple of years, we believe that over half of all workloads — across organizations of all kinds — will be running in the cloud.

Everybody's doing it.

Another year, another plethora of cloud adoption reports saying that cloud adoption is reaching 100%. By that we mean almost all companies are using cloud, not that all organizations are using cloud for everything.

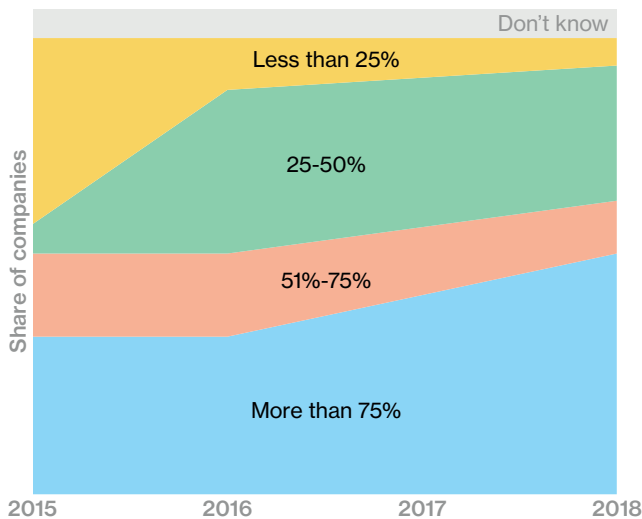## Proportion of workloads in the cloud

Figure 2: Shifting share of workloads in the cloud[2]

In last year's report[1] we found that cloud spend had grown 38% year-on-year. That phenomenal growth continues, with 84% of companies saying that their use of cloud has grown in the last year[2].

84%

of respondents say their use of cloud increased in the past year[3].

Around half of companies say that they will be using cloud for at least 75% of their workloads by 2018. In just a couple of years, we believe that significantly over half of all workloads — across companies of all kinds — will be running in the cloud.

Using cloud isn't enough anymore

As cloud increasingly becomes the norm, the edge it gives a company is falling. It still has a major role to play in delivering competitive advantage, but using cloud is now just table stakes.

Competitive advantage of using cloud

% saying cloud gives competitive advantage has risen

74%	2014
77%	2015

% saying that cloud gives significant advantage has fallen

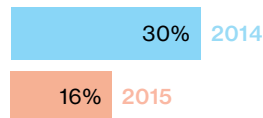|	
30%	2014
16%	2015

Figure 3: Competitive advantage of using cloud, 2015 versus 2014[3]

It's not enough to think "cloud first". To derive significant competitive advantage from cloud you need to think how you can leverage it to enable digital transformation, change how you do business, and disrupt your market.

Has cloud enabled you to adapt business model?
(for instance, moving to usage-based pricing)

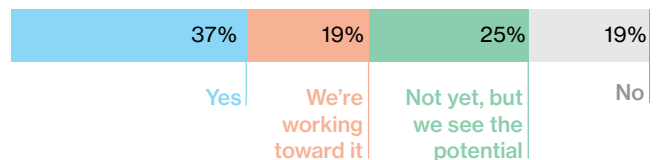| 37%	19%	25%	19%
Yes	We're working toward it	Not yet, but we see the potential	No

Figure 4: Organizations using cloud to adapt their business model[2]

Our research shows that more than a third of organizations have already adapted their business model using cloud — for example, creating new customer experiences or radically changing their cost base. A further fifth are in the process of doing so[2].

Is your strategy fit for the future?

Strategies are diverging.

As the use of cloud has matured, the ways in which companies are using it have diverged. While every company is different, they fall into three personas: the skeptics, the natives and the pragmatists.

The skeptics

It's now widely recognized that technology is key to competitiveness, even survival. And so it's unsurprising that today it's very unusual for us to find an organization that hasn't adopted cloud to some degree. Only 6% of respondents in our survey said they think their company will have less than 25% of workloads in the cloud by 2018, shown in Figure 2.

It's not that these companies — we call them skeptics — don't see the potential benefits of cloud, it's that they are yet to be fully convinced. Companies in this group aren't rejectors, they almost certainly use SaaS, and probably lease hardware and software stacks from vendors. While this doesn't give them demand-based pricing, it does give them some insulation from upfront capital costs.

Skeptics' reluctance is often due to corporate attitude toward risk management, governance, or capital investment. Some industries, like financial services, are home to more skeptics than others. As cloud becomes more established and skeptics see what their competitors are able to do with cloud, their numbers are dwindling.

The natives

It's not just the unicorns — those highly distinctive businesses like Uber and Spotify, often cited as examples — many businesses are now cloud-first or even cloud-only. We call these companies the cloud natives.

You don't have to be small or a start-up to be a cloud native. With everything from spreadsheet to enterprise resource planning (ERP), customer relationship management (CRM) and payroll software available in the cloud on a subscription basis, many companies are choosing to buy services rather than servers.

The pragmatists

The skeptics and natives form the ends of a wide spectrum. The majority of organizations are taking a measured approach, striving to create an enterprise-class infrastructure using standard components from cloud providers tied together using APIs and orchestration services. We call these companies the pragmatists.

> " Typically these companies have a thorough understanding of what's involved in a cloud project and what options are available.

Even when faced with an extremely demanding workload with complex requirements, they will work with specialist enterprise service providers to build the infrastructure they need. This might include sophisticated load-balancing and acceleration, and highly resilient, ultra-high bandwidth connections between systems.

In a sense, these organizations are the true believers. Even though they have large estates and complex legacy applications, they are so convinced by the benefits of the cloud approach that they are rewriting the rulebook.

This model, hybrid IT, brings together cloud, both public and private, with on-premises and colo. It also recognizes the importance of the network. Tying all this together can be challenging. Many pragmatists have turned to managed services providers to help them.

The companies leading the way in this group use a sophisticated scoring system to assess each workload on characteristics like sensitivity of data stored, availability requirements, and elasticity required. Some have even automated this process so that they can spin up an appropriate environment with little manual involvement.

Some early pragmatists relied heavily on vendor-specific cloud features, making it hard to move systems as needs changed and new options emerged. Because of that, pragmatists are focusing on how to avoid vendor lock-in while increasing automation.

Most companies need a mix of different types of cloud to provide the value, manageability and security they require.

Models are changing.

Private cloud is becoming less exclusive

> We see companies increasingly turning to private cloud and believe that in the future public cloud will only be used in very specific circumstances.

One of the biggest changes we're seeing in the cloud market is a dramatic fall in the barriers to entry of private cloud. This is largely being driven by advances in technology. Lower starting costs mean that private cloud is no longer only suitable for those with huge budgets — even a relatively small number of servers can be economically viable as a private cloud. And this narrowing of the price difference between public and private cloud is changing the value equation.

Current/near-term cloud adoption plans

Currently using

27%	**Private**
24%	**Public**

Firm plans to implement

17%
13%

Educating/evaluating

27%
28%

No interest/don't know

28%
35%

Figure 5: Enterprise expectations of cloud adoption[4]

In the past, the approach taken by many companies roughly followed a similar model: public for non-sensitive workloads; private cloud for more sensitive stuff; and traditional on-premises for difficult-to-move and highly sensitive workloads. Because the cost of private cloud is falling, it now makes sense for many companies to move more of their workloads to private cloud.

There will always be a place for public cloud, especially for workloads that need lots of elasticity but perhaps not so much in the way of risk management and governance. Many websites (but not e-commerce) and testing projects would fall into this category.

But with the cost difference falling, the additional reassurance offered by private cloud is very appealing. We see companies' reliance on public cloud declining (see Figure 5), and believe that in the future it will only be used for a narrow set of workloads.

Likewise, at the difficult-to-move (whether that's due to performance, security or refactoring concerns) end of the spectrum, the cost benefit of moving from legacy environments is now even more compelling. So for many applications destined to be sunset — perhaps five years or more in the future — the cost-benefit analysis now favors an extended life in the cloud.

> Financial benefits (outside of potential cost savings) are significant: 40% say it has increased revenue and 36% say it has increased profit margins[3].

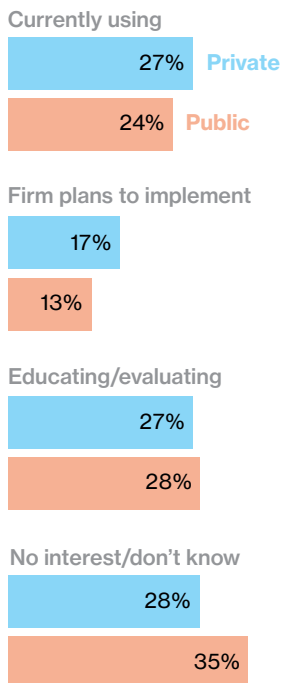We should stress here that the benefits aren't just financial, they also include keeping users happier, improving risk management, and enabling digital transformation. As we all know, legacy systems are one of the biggest obstacles to system integration and innovation and cloud can help alleviate this.

Hybrid cloud is now mainstream

Advances in technology are changing the cost-benefit equation and making it easier for companies to build more powerful environments in the cloud, enabling them to move more workloads and transform more processes.

It's been suggested that hybrid cloud – the use of a mix of models, including on-premises and public and private cloud – will become mainstream within five years. We think that it already is, especially for large organizations.

There are already services that enable companies to create a sophisticated environment made up of multiple clouds from multiple providers, but make it look like a seamless part of the enterprise infrastructure.

Many companies still rely on core systems built on legacy technologies that can't be moved to the cloud and which they aren't ready to refactor or replace. This can hold back transformation efforts, like improving the customer experience. With hybrid IT, these systems could be physically colocated in the same place as a private cloud, creating a reliable, high-performance solution.

75%

According to a recent survey by Cloud Cruiser, three quarters of companies said that they planned to include hybrid cloud as part of their strategy[5].

Hybrid deployments can be complex to build and maintain. While the technology is already mainstream, it's still a relatively new area and there's a lack of people with the necessary skills and experience.

Many companies are turning to managed service providers to help build and manage the environment they want. Taking this approach can help overcome the challenges with moving to cloud, deliver significant cost and business-agility benefits, and reduce the risk of making the wrong technology decisions.

Around half of companies now use hybrid cloud, or can easily move workloads between clouds

50%
use a mix of public cloud, private cloud and traditional IT resources

48%
have workload portability across public and private cloud resources

Figure 6: The use of mixed cloud environments[4]

Cloud is now an integral part of many companies' IT decision-making processes.

It's business as usual.

It's prime time

Organizations aren't just using more cloud, they are using it for applications that are more demanding and more important to everyday operations and performance. This often includes multiple mission-critical applications.

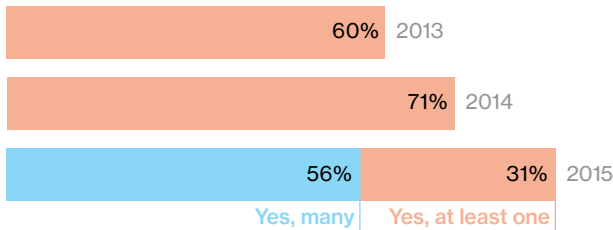**Do you use cloud for mission-critical workloads?**

60%	2013
71%	2014
56% — 31%	2015
Yes, many — **Yes, at least one**	

Figure 7: Companies with mission-critical workloads in the cloud[2]

For the types of workloads that organizations put in the cloud from early on — like web apps and dev/test — cloud is now dominant. But cloud is rapidly gaining ground even in mission-critical areas — over a third of companies have at least half their ERP workloads in the cloud.
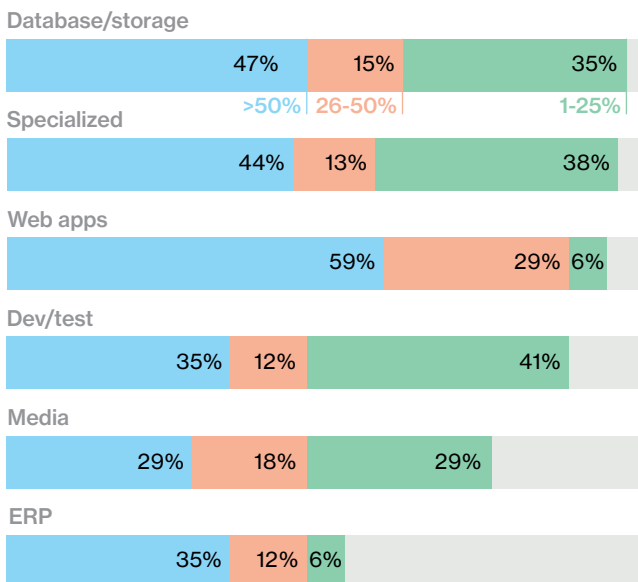
Share of workloads in the cloud

Database/storage

>50%	26-50%	1-25%
47%	15%	35%

Specialized

44%	13%	38%

Web apps

59%	29%	6%

Dev/test

35%	12%	41%

Media

29%	18%	29%

ERP

35%	12%	6%

Figure 8: Workloads in the cloud by application type[2]

It's no longer seen as a "project"

A lot of organizations have completed their first wave of "cloud migration" projects. These projects actively sought workloads to move to the cloud and picked up all the stuff that was easy to move.

But cloud is now seen as just as reliable and secure as traditional delivery models — if not more so. And many companies are considering it alongside on-premises and other delivery options when provisioning a new app or performing a review of their current portfolio.

What's the availability/reliability of your cloud environment compared to your own on-premises infrastructure?
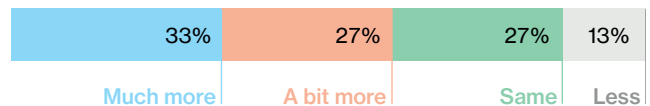
33%	27%	27%	13%
Much more	**A bit more**	**Same**	**Less**

Figure 9: Reliability of cloud versus on-premises[2]

How secure is your cloud environment compared to your on-premises infrastructure?

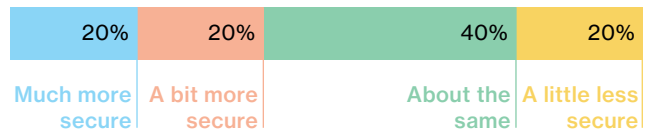| 20%	20%	40%	20%
Much more secure	**A bit more secure**	**About the same**	**A little less secure**

Figure 10: Security: cloud versus on-premises[2]

Some organizations are now targeting specific groups of apps for migration, often because they are difficult to manage or becoming a roadblock to transformation. We're also seeing more and more workloads moved as part of routine application portfolio management.

68%

say they must invest in cloud/ SaaS to achieve business priorities[6].

It's chosen for strategic reasons

Application portfolio reviews consider the value delivered by each application versus its cost — including maintenance and support. While cost was an early differentiator for cloud, increasingly organizations are choosing cloud for the value it can add, not how much it can save them.

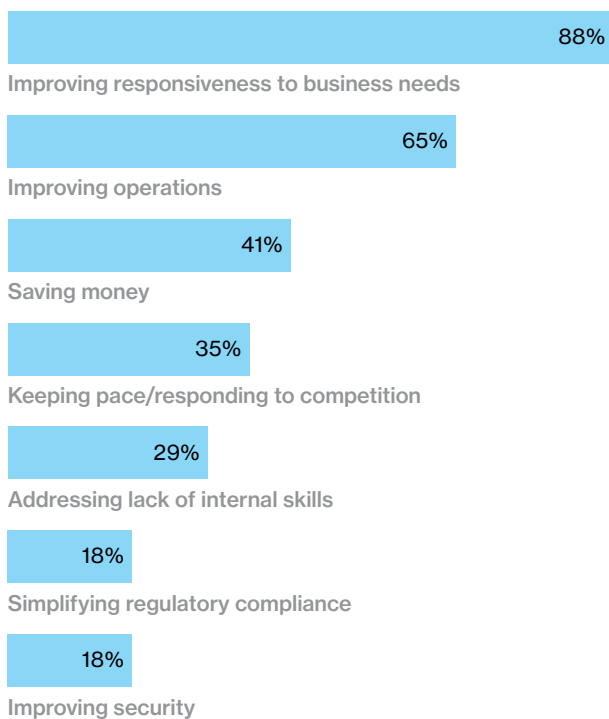**Main reasons for moving mission-critical workloads into the cloud**

88%	Improving responsiveness to business needs
65%	Improving operations
41%	Saving money
35%	Keeping pace/responding to competition
29%	Addressing lack of internal skills
18%	Simplifying regulatory compliance
18%	Improving security

Figure 11: Reasons for migrating mission-critical workloads[2]

But the capabilities and economics of cloud are changing so quickly that organizations must review their decisions more frequently. Where in the past decisions about core systems might have looked 20 years ahead, today decisions made just a year ago could be no longer valid. Failure to revisit plans doesn't just risk overspending on IT, but could mean being outmaneuvered by competitors and losing market share.

It's many companies' first choice

A growing number of organizations — the US government was one of the earliest — have made cloud their preferred choice. It's not just natives, many pragmatists are now thinking "cloud first".

This reflects the fact that not only are the economics favorable, but cloud enables so many of the other things that companies are trying to achieve.

83%

say that their company sees IT as "an opportunity to differentiate/ disrupt and gain market share"[2].

Whether it's developing internet of things services, increasing use of mobility or creating new customer experiences, cloud is often an important enabler. Bringing services together in the cloud can help organizations integrate systems and data, accelerate innovation and align business and IT strategies.

55%

say they need to invest in alignment of business and IT strategy to meet their 2015 business priorities[6].

Just because cloud is no longer new doesn't mean it doesn't present challenges. There's plenty to do to make the most of the opportunities.

Recommendations.

Keep projects short

While it's important to take a strategic approach to cloud, with structured programs and robust measurement, it's important to keep projects short.

> Many cloud migration projects can be completed quickly and these are the most likely to be successful.

We've found that six months is a good upper limit on the length of a project. This helps maintain momentum and limits the impact of technology changes.

Don't try to do it alone

Cloud is a broad field and a rapidly moving one. Keeping abreast of the changes in technology is no easy feat. It's not just hard to recruit and train the right people, it's difficult to know what skills you'll need in a year's time.

Many companies lack sufficient experience with cloud projects, especially those involving mission-critical applications and major transformation. And while standards and frameworks are evolving, these are only part of the answer.

> In the absence of any agreed standard, many US state and local government bodies are adopting the federal government's FedRAMP framework to assess cloud services.

Managed service providers can supply specialist skills and knowledge, augment internal capacity, and free up the internal team to focus on governance and monitoring how well the cloud platform aligns to business needs.

Improve transparency

The concept of shadow IT still comes up in many articles on cloud. But in our experience it's more of a media fascination than a reality. While the LOBs have more technical expertise than before, they still rely on IT.

Despite the advent of cloud, managing enterprise infrastructure remains a highly specialized task and even IT departments are struggling to attract and retain the right talent. Most organizations believe that achieving digital transformation requires a well-thought-out, companywide approach — not mavericks with credit cards.

> Another interesting data point revealed that 44% of the respondents do not have any means to employ chargeback or showback for their delivery of IT services, but 56% indicated that they were planning to provide service cost transparency to their businesses[5].

Most IT functions have adapted to meet the demand to be more responsive and flexible, but there's still room for improvement. Studies suggest that IT budgets are only growing slowly, if at all, and most of that money is still being spent on keeping the lights on.

The provisioning and movement of environments will eventually be highly automated based on business rules. Until then, the IT function must serve as a center of excellence for scoping and management. Improving reporting on performance and internal recharging will help IT demonstrate the value that it's adding and get the money it needs to fund transformation.

Continually reassess security

Managing risk remains a "go to" topic when discussing cloud. Few articles fail to highlight the perceived dangers. But in the last two surveys that we've undertaken, fewer than 5% of companies had experienced a significant data breach that was directly attributable to a cloud-based service – and that includes SaaS applications[2].

As cloud became more pervasive within organizations, IT had to step in and make sure that it was properly managed from a policy, control and compliance standpoint. The result has been a decline in shadow IT projects, clearer definitions of expectations and greater service-provider transparency. So now when we ask about cloud, most companies say that their cloud environment is as secure, if not more secure, than their traditional infrastructure.

In the past, studies have shown that many companies keep paying for security services that have been shown to be ineffective – a bit like sticking to your lottery numbers. The shift to cloud forces companies to reassess the focus of their security and governance spend, and this can lead to greater effectiveness and better value for money.

Reporting has a key role to play. When assessing cloud providers, ask them about their reporting capabilities. Choose one that's able to provide extremely granular and reliable information on demand and performance, consistently across applications and functions. As well as providing valuable inputs for planning, this information can help you keep reassessing your security needs.

Some vendors have launched specialized solutions tailored to specific security and compliance needs. Consider options, like PCI-DSS- or HIPAA-friendly services, to accelerate solution development and reduce the burden of managing governance and compliance.

Don't forget the network

IT and the LOBs, and even analysts, agree that connectivity is critical to the success of cloud projects.

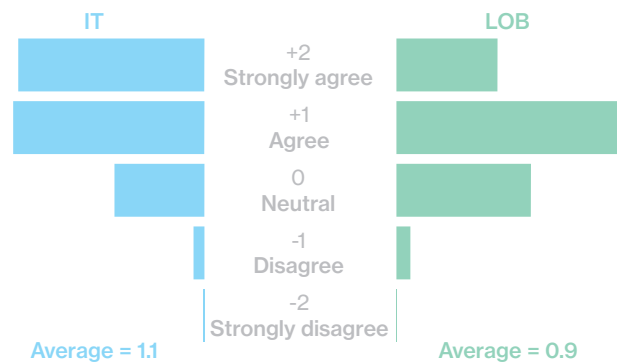**"The network is critical to the success of cloud projects"**

Figure 12: Agreement with the statement "the network is critical to the success of cloud projects", split of respondents[6]

As more companies have come to rely on cloud services for mission-critical workloads, the importance of connectivity has grown. Many companies have already switched to dedicated cloud connection services to improve performance and reliability.

> " Through 2015, at least 50% of cloud deployments will suffer from business-impacting performance issues, requiring extensive network redesign to address them[7].

Software-defined networking (SDN), promises to bring many of the same benefits to networks that cloud has to hosting. While SDN is still in its infancy, it's something you should take into account when making network decisions.

To find out more about how our managed cloud services can help you move more complex workloads, create an effective hybrid IT environment, and allow you to focus on innovation, not infrastructure, visit:

verizonenterprise.com/cloudreport2016

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