# HOW TO BUILD A BETTER CLOUD

## PART ONE: PLANNING

**Key considerations for your hybrid cloud journey**

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# INTRO

We are in the middle of the cloud revolution. In 2016 the cloud accounted for over 50% of IT spend (Gartner), and now, in 2017, over 50% of companies are operating in the cloud. For those not yet fully in the cloud, it is often the complexities of establishing a robust but agile hybrid cloud architecture that have delayed the move. These are the businesses this paper is designed to help.

The first thing worth knowing is that coming later to the cloud should work for you. There has never been a better time to make the move. There are tried and tested bundled offerings, there is good analysis, there are piles of best practice cases, and very well-populated and user-friendly cloud user communities. And the cloud service market itself is maturing fast and highly competitive, with more sophisticated solution providers as well as more and better vendor-agnostic data center-based cloud marketplaces with easier interfaces.

At the same time, migration to a hybrid cloud requires detailed planning and deep buy-in. Key to success is to explain and sell the process at every level. So, while this paper is intended to give IT Directors, CIOs and CTOs, reminders and ideas, with access through online sources and further reading to deeper information, it is also meant to work as an introduction for non-technical senior managers. The paper has been structured as a framework for the planning (Part 1) and implementation (Part 2) phases, with tips based on what has gone before and a snapshot of the sort of things you need to consider, learn about and do in order to research, develop, build and move into a hybrid model that works hard for – and can transform – your business.

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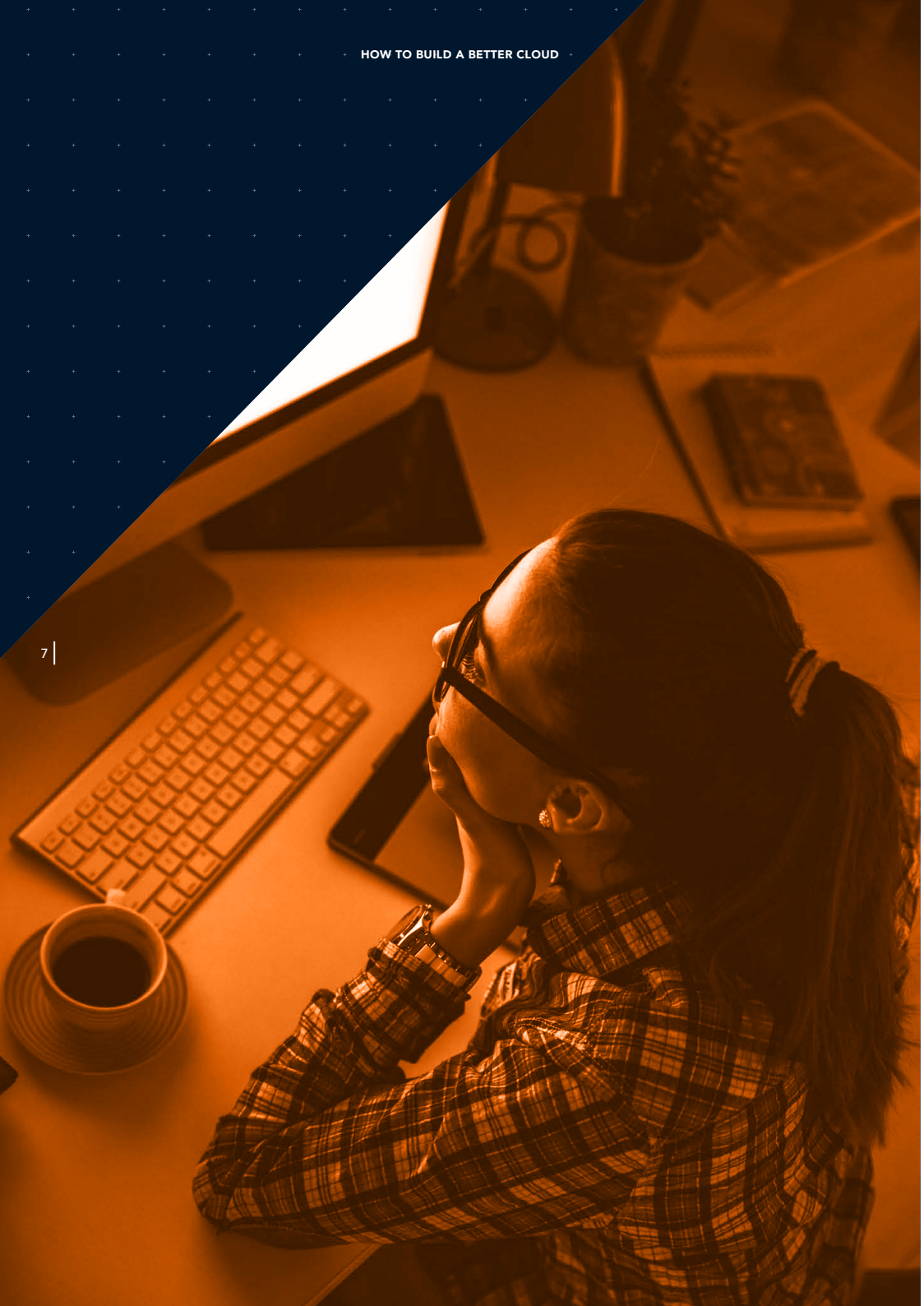






# BENEFITS OF THE CLOUD

## Flexibility

**Scalability:** Cloud infrastructure scales up – and down – to support fluctuating workloads

**Storage choice:** Choose public, private, or hybrid storage offerings to suit

**Control:** Set your level of control with as-a-service options, i.e. software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS)

**Security:** Virtual private cloud, encryption, and/or API keys help keep data secure.

## Efficiency

**Accessibility:** Apps and data accessible from any Internet-connected device

**Speed to market:** DevOps in the cloud speeds time to market

**Data security:** Network backups avoid loss of data through hardware failures

**Equipment Savings:** Using remote resources saves on cost of servers and more

**Pay as you go:** Utility structure means users only pay for the resources they use.

## Competitive edge

**Streamlining:** Cloud service providers (CSPs) manage underlying infrastructure, allowing you to focus on the front end

**Fresh Tech:** Service providers regularly update ensuring the latest technology

**Collaboration:** Worldwide access means geo-independent teams

**Speed:** You can partner, create and move workstreams and solutions faster.

# HYBRID CLOUD: IF NOT NOW, WHEN?

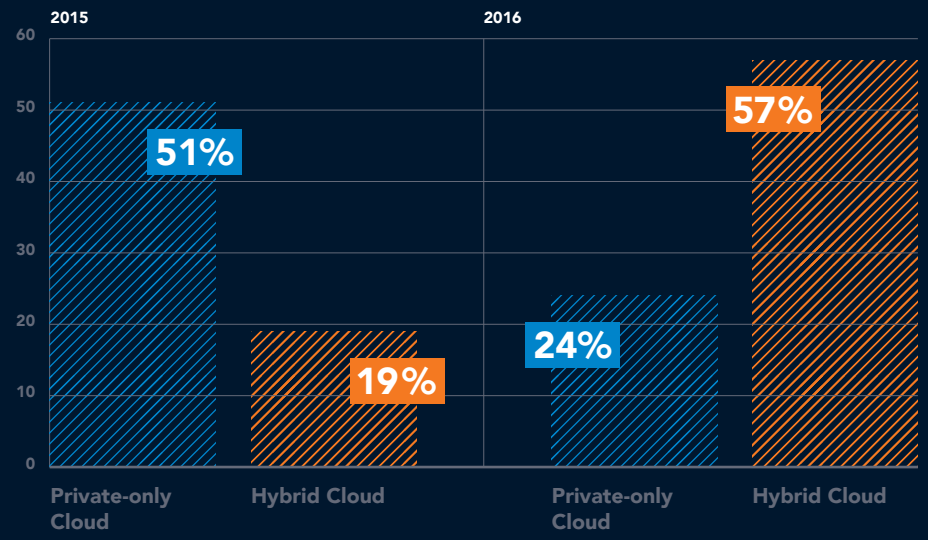
**According to security firm McAfee, hybrid cloud adoption tripled last year, increasing from 19% to 57%. While that may seem like a slight exaggeration compared to other reports, the figures are a clear indicator of the pace of change. The firm's Cloud Security Report goes further, saying that by 2018, 80% of all IT budgets will be committed to cloud solutions.**

According to Gartner the majority of growth will driven by cloud infrastructure services (IaaS: 36.3%) supported by consistent demand for software as a service (SaaS: 20%) and both service segments are forecast to double in value between 2016 and 2020.





**Hybrid shoots ahead.**




*Source: McAfee Cloud Security Report, September 2016*

Any way you look at it, the cloud adoption pace is picking up, and this is being driven by changing user attitudes. Rightscale's comparative study below tells a reassuring story. Cloud users are growing in confidence year-on-year, and key concerns – challenges which may have put a business off wholesale cloud adoption previously – are being overcome. At the lower end of the scale, complexity and performance are less challenging, with spend management, compliance and governance remain steady. At the top of the challenge list significant headway is being made in overcoming the key challenges of security and resourcing/expertise with a 4% and 7% drop in challenge level respectively.

These are all still very significant challenges, particularly where security meets resourcing. According to McAfee 49% of businesses that are delaying cloud deployment say they are doing it due to a cybersecurity skills gap. But the pattern of increasing capability and confidence is clear. The financial and healthcare sectors have led the way in cloud adoption – both sectors in which security is paramount.

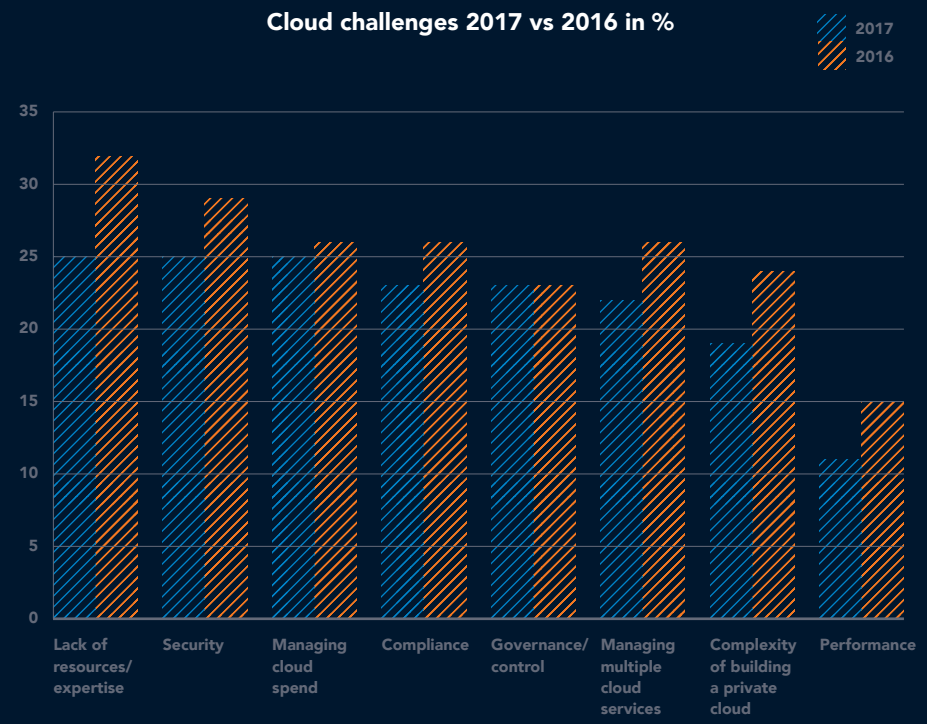
Multicloud strategies are far more common. Workloads are shifting wholesale to the cloud with more companies deploying more clouds. Rightscale estimate that enterprises are running 32 percent of workloads in the public clouds and 43 percent in private clouds, with users running applications in an average of 1.8 public clouds and 2.3 private clouds and experimenting with around the same number in each category.

Quality is also improving. Price-to-performance is generally excellent, with many publicly available league tables. SLAs, standards and certifications are maturing, but still inconsistent, so these need close attention.





Considering the undoubted benefits in agility, efficiency, and competitiveness that the cloud brings, the risks of full adoption have clearly become acceptable for the vast majority of businesses. Pricing continues to nosedive as competition broadens, initial investments are covered and the economies of scale of the cloud are passed on to attract new users. If your organisation has yet to commit to a full hybrid cloud architecture, now is the time, and, if your planning and partnerships are right, all of the above factors will work in your favour.




*Source: Rightscale 2017 State of the Cloud Report*

# SCOPE & STRATEGY

**One cloud does not fit all. Build a strategy that is based on your business needs, not the products available in the market. Identify where the greatest benefits of the cloud lie; not just in terms of savings, but in security; not just in upward scalability but in elasticity and agility.**



Make sure you have a clear understanding of the business outcomes you want to achieve, and a broad idea of the services or applications with capabilities that can deliver those outcomes. Tailor them as closely as possible to the current needs and resources of your organization. While working in the cloud will change your organization over time, you do not want the first steps to destabilize it. Then, once you have buy-in for the business case you can review the products, technologies and services you will need to build your cloud environment.

The business outcomes you define need to be very clearly articulated and well understood. The clearer the connection between cloud investments and desired business outcomes, the greater the chance of success. For instance, how much Capex do you want to cut out and in what areas? What impact do you want to make on product development speed? Which inefficiencies will be converted to efficiencies? Over what time period?



# SERVICES & DELIVERY

You can then define your cloud portfolio, aka service catalog – a list of the services or applications that can deliver those outcomes. Include information such as who will be responsible for management and maintenance, functionality, cost to set up and run, security parameters, SLAs.





**Once your portfolio is defined, you can focus on the critical public/private cloud division, and then drill down to more specific delivery models.**



## Private v Public: 10 Key Pros & Cons

### Private

✚ Some sectors require sensitive transactional and customer data to be stored on dedicated servers inside the corporate firewall. If that's the case in your business, a private cloud is your only option.

✚ Even where regulation plays no part, private clouds can be more secure than online, multi-tenancy environments as critical systems and data remain inside the business at all times. So private clouds are often chosen for managing mission-critical applications and data.

✚ Because organisations have full control over private clouds, it's possible to build in bespoke solutions for fault tolerance, business continuity and disaster recovery.

– Private clouds will always have a potential capacity ceiling due to the limitations of the physical hardware on the server floor.

– Beware of private cloud vendors who lock you in with proprietary software, APIs and standards – increasing costs, forcing unwanted upgrades and limiting access to the latest cloud features.

### Public

✚ No hardware limits exist in the public cloud. A range of providers give businesses immediate, cost-effective access to elastic online compute and storage resources on demand.

✚ Public clouds are ideally suited to handling high-volume, routine workloads that present minimal security risks, and developing and testing new solutions in the market.

✚ To provide additional flexibility, public clouds allow customers to choose their preferred operating system, reducing the risk of vendor lock-in and functionality limitations.

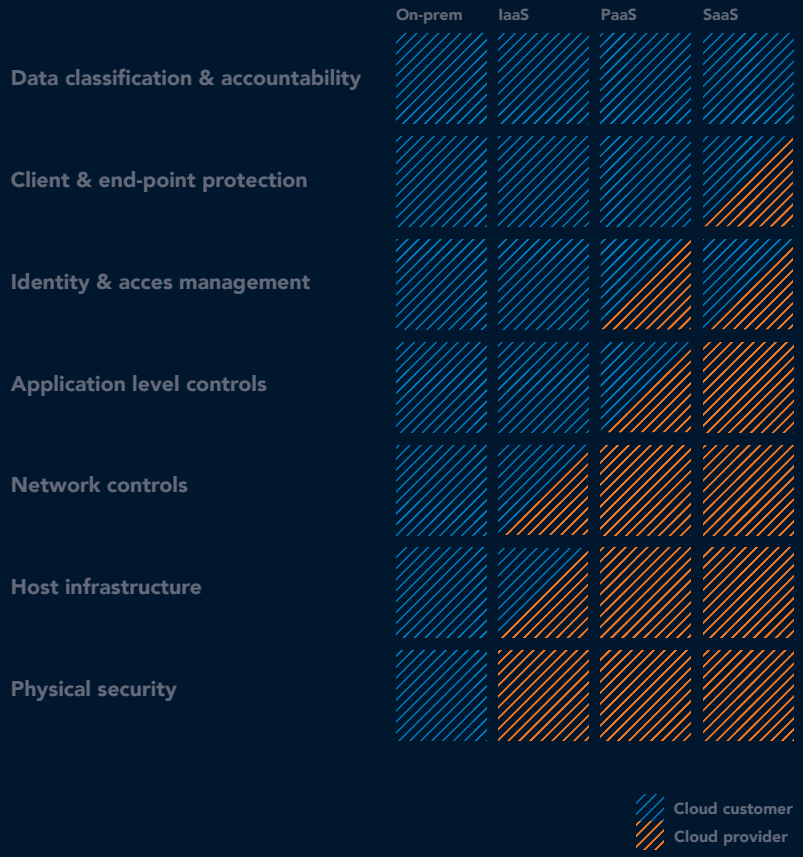
– However, some use proprietary APIs, which could reduce the flexibility to move workloads to other cloud providers in the future.

– Public clouds are multi-tenancy environments that are seen as less secure than private clouds.

– Each public cloud provider also has its own SLAs for security, backup, disaster recovery and availability. These have to be assessed very carefully and integrated with your performance needs.

**Consider factors such as cost (and spread of cost), compliance, internal capabilities, security, data sovereignty, continuity requirements for each different service. The appropriate delivery model will quickly become clear.**

**IPS Service Responsibility Line**








A key consideration in defining delivery models should be the SRL (Service Responsibility Line) illustrated here. Normally, the cloud service provider offers management services at or below the line as part of the standard cloud service offering, while your organization is responsible for the elements above it. Focus as closely as possible on the workloads and responsibilities around the area of the line, and assess the capabilities you have or might need to manage the hand-offs, overlaps and gaps between systems, service providers and locations in this area.

# RESOURCE REVIEW

**Make the most of your assets, both data and people.**
**A large part of a company's potential is locked away in isolated databases and applications and the move to the cloud is an opportunity to leverage this. A common approach is to keep databases with confidential or valuable information – financial systems, HR, payroll, customer data – private, while moving web servers, retail servers and so on to public cloud environments.**
**The key consideration is that these datasets must be synchronised, with data collected properly and running fluidly from cloud-based applications.**

On the personnel front, you will need a new skillset moving into the cloud. Audit what you have and don't just look for new hires, there are plenty of good training modules available, and a lot of the most relevant public cloud certifications are new. Someone that knows the business is often better placed to sell new ideas and solve problems internally.

Networking expertise will be key to managing the network for private cloud infrastructure, as well as design for public cloud environments. You will need a security expert that can build on public cloud security tools, manage dual factor authentication and deploy IPS intrusion prevention systems on top of IDS intrusion detection systems to stop DDoS attacks.



Someone on the server and storage side must orchestrate multiple operating systems and servers and ensure built-in redundancy and be able to optimize CPU and memory utilization. This role will probably extend to overall business continuity and may need to be supplemented with skills in application database installation, monitoring and updates. To exploit the opportunities of the cloud, you will also need strong and creative developer skills.

A key resourcing question which impacts the above is; do you want to build your own or do you want to lease private-cloud space on a third-party platform? For most businesses an external provider is the answer, adding expertise and tested resources. Generally speaking, the smaller a company, the more outside help it needs when moving to the cloud, and the best place to start is with a private cloud hosted by a cloud service provider with non-sensitive information. Build this into your Cloud Roadmap then, as you get more comfortable, you can expand.

# MAKE THE MOST OF YOUR ASSETS, BOTH DATA AND PEOPLE

# READINESS

**Your organisation will already be a long way down the road of server virtualization and all the benefits that brings. The next step will deliver harmony and connectivity between systems, data, services and infrastructure to realize your strategic objectives further down the line.**

Interoperability is vital. Both private and public cloud infrastructure, old and new systems, must be migrated into and built on open-standards-based, open-source technologies, such as OpenStack, from the ground up. This allows workloads to be migrated seamlessly between private and public clouds when needed and integrates with all the popular platforms like SAP, Microsoft, AWS or Google. Leading open-source operating systems can be used to spin up virtually unlimited numbers of guest server instances at no additional cost. They provide tools for fast bare metal provisioning and orchestration, deployment and scaling.

Open source platforms will also enable you to standardize and automate deployment and configuration of servers and applications, using tools like Chef, Puppet, and Ansible and, more recently, container technologies, like Docker and container orchestration and scheduling tools like Kubernetes, Swarm, and Mesosphere.



Conduct a thorough review of existing infrastructure, prior to extending your existing platform into an integrated hybrid cloud model. A useful output from this process is a Business Impact Analysis as well as an overall Cloud Readiness Assessment. These two reports will allow your organization to understand existing workloads, which need to be extended into the cloud, and how this will impact the business, with the Readiness Assessment giving you an overview of how ready your applications, users, and data sets are for a cloud migration.

Based on these analyses and an ROI report, you will have clear options for implementation with infrastructure, applications and workloads matched to the correct delivery models and service and budget parameters.

# SELLING THE STRATEGY

**In the run-up to implementing your final Cloud Roadmap, an error that many organisations make is to underestimate the cultural challenge the cloud can present. Building out a cloud platform is not just a project, it is a whole new basis for doing business.**

Operating in the cloud engages everyone in the business more closely with the IT organisation, and because of this, full engagement with stakeholders, modelling, business cases and strategy development across departments in the planning stages is key.

Managing 'shadow' IT – and bringing these unacknowledged apps into the cloud fold – is a part of this. Also important is the disruption of established behaviours like 'server hugging' and excessive bureaucracy, and the encouragement of new ones, such as as-you-get-it training, and (as the workforce increasingly becomes the frontline for some data sets) new levels of personal data security.

On the plus side, digital transformation becomes a realistic goal. The cloud's elasticity, rapidly growing suite of readily-available applications, and ability to both run applications anywhere and deliver data to the end-user wherever he or she may be, make it the foundation for a digital transformation strategy. From fixed infrastructure and proprietary IT, businesses using cloud are free to take more risks and are able to respond quicker to changing market conditions, enabling them to become businesses they could never have become without the cloud.

# CONCLUSION: PLANNING CHECKLIST

**The planning process and the time and resources it requires will vary considerably by organisation, but the following key activities should each be considered in the run-up to cloud implementation:**

- Business needs definition
- Outcomes definition and articulation
- Cloud Portfolio/Service Catalog creation
- Cloud Delivery Model analysis
- Resource Review: data and team
- Cloud Readiness Assessment, budgeting, ROI analysis
- Culture check, internal stakeholder engagement program
- Cloud Roadmap launch





# SOURCES & FURTHER READING

**McAfee State of Cloud & Security**
www.mcafee.com/us/solutions/lp/cloud-security-report.html

**Rightscale 2017 State of the Cloud Report**
www.rightscale.com/blog/cloud-industry-insights/cloud-computing-trends-2017-state-cloud-survey

**Gartner forecasts**
www.gartner.com/newsroom/id/3616417

**Team-building**
www.bloomberg.com/professional/blog/build-dream-team-master-hybrid-cloud/

**Cloud and culture**
www.riverbank.co.uk/it-blog/the-top-10-cultural-changes-when-migrating-to-the-cloud-computing-article

**Digital transformation**
www.zdnet.com/article/digital-transformation-in-the-cloud





**There is a huge amount of free information available.**
**Here is a selection worth exploring:**

**News**
The WHIR news and info: www.thewhir.com/category/cloud-computing
CloudTech: useful news stream: www.cloudcomputing-news.net
NetworkWorld from IDG: www.networkworld.com

**Insights**
Detailed planning: www.cloudindustryforum.org/content/cloud-adoption-roadmap
451 cloud research and insights: www.451research.com
Hybrid considerations: www.computerworld.com/article/2834193/cloud-computing/5-tips-for-building-a-successful-hybrid-cloud.html
EuroCloud pan-European know-how and standards: www.eurocloud.org
Performance and pricing analysis: www.cloudspectator.com

**Groups**
Spiceworks Cloud Computing & SaaS forum: www.community.spiceworks.com
Google forum: www.groups.google.com/forum/#!forum/cloud-computing
Linked in Virtualization & Cloud Computing Group:
www.linkedin.com/groups/57400/profile
Linked in Cloud Security Alliance: www.linkedin.com/groups/1864210/profile

**Standards**
European Cloud Standards Coordination: www.csc.etsi.org
Cloud Standards Customer Council: www.cloud-council.org

**Training**
Digitale Infrastructuur Nederland: Cloud University project:
www.dinl.nl/en/dossiers/cloud-university
Interactive learning: www.cloudindustryforum.org/content/e-learning-courses

**Cases**
CIO insights on cloud journey (hospitality, automotive, events, gaming):
www.i-cio.com/strategy/cloud/item/four-pioneering-cios-on-the-journey-to-a-cloud-centric-world
Financial services sector move to hybrid presentation: www.vimeo.com/152443510

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