Cloud

A New-Age Solution To High-speed IT Performance And Faster Disaster Recovery

VERITIS

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INTRODUCTION

The IT industry has undergone a wide range of transitions over decades, from struggling with critical hardware maintenance in-house to today's simplified 'over the network' services.

Thanks to the technology and internet revolution that brought this huge transformation, easing IT process burden, saving time and resources, and minimizing human-intensive tasks.

The result of decades-old efforts is right in front of us i.e., a tough competition between 'innovation' and 'process execution'.

Innovation has always been key to growth in IT business but executing that as envisioned was a herculean task in the past. Filling that gap, process execution also started getting its pace at par with innovation as a result of technology advancements.

The secret of success now lies in the 'speed at which a business is executed', and the winner of the race will be the one who maintains a perfect sync between 'innovation' and 'execution'.

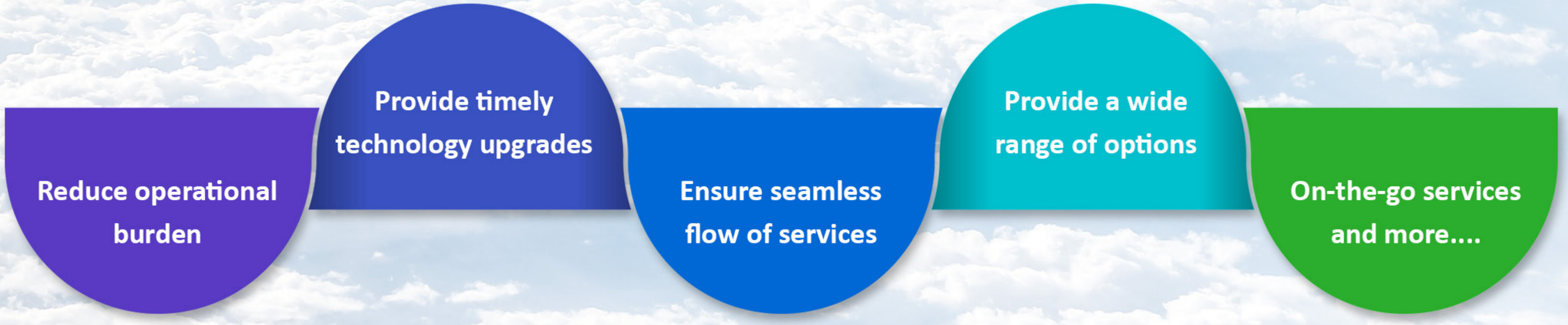
This Whitepaper details about the technology solution that laid a successful path for this perfect sync. And, we call it the '**Cloud Computing**'!

The Rise of Cloud Computing

- Won't you be willing if there is an external support available to take care of your internal IT operations?
- Will that not attract you if there is a separate unit to handle your complex and expensive IT infrastructure, on-demand through paid services?
- Doesn't that excite you if there is a potential supplier to guide you on meeting ever-changing market expectations and competition?
- Is it not stress-free to hand-over your IT burden to an external provider instead of struggling with internal IT teams who might sometimes be unaware of your core services?

This is where **'Cloud Computing'** made a big difference!

Cloud Computing emerged out of the dire need for on-demand availability of computing resources and on-demand service providers, who can:



The rise of cloud computing eased critical IT processes, bringing in a new pace of execution and enhanced customer satisfaction.

An Overview of Cloud Computing

This section details cloud computing technology by its definition, deployment and service models, and also provides a snapshot of **'Cloud vs Traditional IT'** along with ways to set up your cloud vision.

Cloud By Definition

The National Institute of Standards and Technology (NIST) defines Cloud Computing as:

A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Characterized by three service and four deployment models, cloud computing presents a continuously-evolving paradigm.

"Its definitions, use-cases, underlying technologies, issues, risks, and benefits will be refined in a spirited debate by the public and private sectors. These definitions, attributes, and characteristics will evolve and change over time," states NIST.

Cloud Over Traditional IT Models

Following five features describe Cloud's advantage over traditional IT models:

1. **On-Demand Services**
   Cloud solutions provide the consumer a wide range of computing capabilities such as server time and network storage, enabling them to automatically claim services as and when required at the infrastructure, platform or application levels. All over the network!

2. **Wider Network Access**
   Maximum market reach or access is important for any business growth. Greater the market reach for services is, greater will be the scope for potential sales. With its wider network access feature, cloud computing helps business to expand their services to wider audience, irrespective of geography and size, with accessibility on any device type.

3. **Dynamically Pooled Resources**
   While traditional IT model remains limited to single enterprise in service-offering, cloud breaks the barriers. Encouraged by cloud's ability to expand pooled resource capabilities dynamically, cloud service providers can extend maximum service levels with minimum resources, ensuring Quality of Service at low costs.

4. **High Elasticity**
   Unlike traditional IT models where every new addition is a new investment, cloud provides flexible computing service that can be expanded or contracted according to business demands. Cloud's on-demand utilization and pay-as-you-go models are classic examples for this feature.

5. **Transparency**
   Since cloud services work on pay-per-use basis, every single transaction is measured, monitored, reported and controlled, thus ensuring transparency between company and service provider in every service-offering. Customers here will have informed choices!

Cloud Deployment Models

Cloud is available in different deployment variants depending on the organizational demands, as:

Public Cloud refers to the cloud infrastructure owned by an organization and is accesible to general public or a large industry group. This doesn't mean compromising security as providers use some security mechanisms to control safeguard and control access to user data. Available either 'for free' or with 'basic charges', public platforms are easy to set-up and cost less compared to other cloud models. Here, the provider creates the cloud for the user and the latter has to just configure resources as per business requirements. Public Cloud allows resource sharing among consumers.

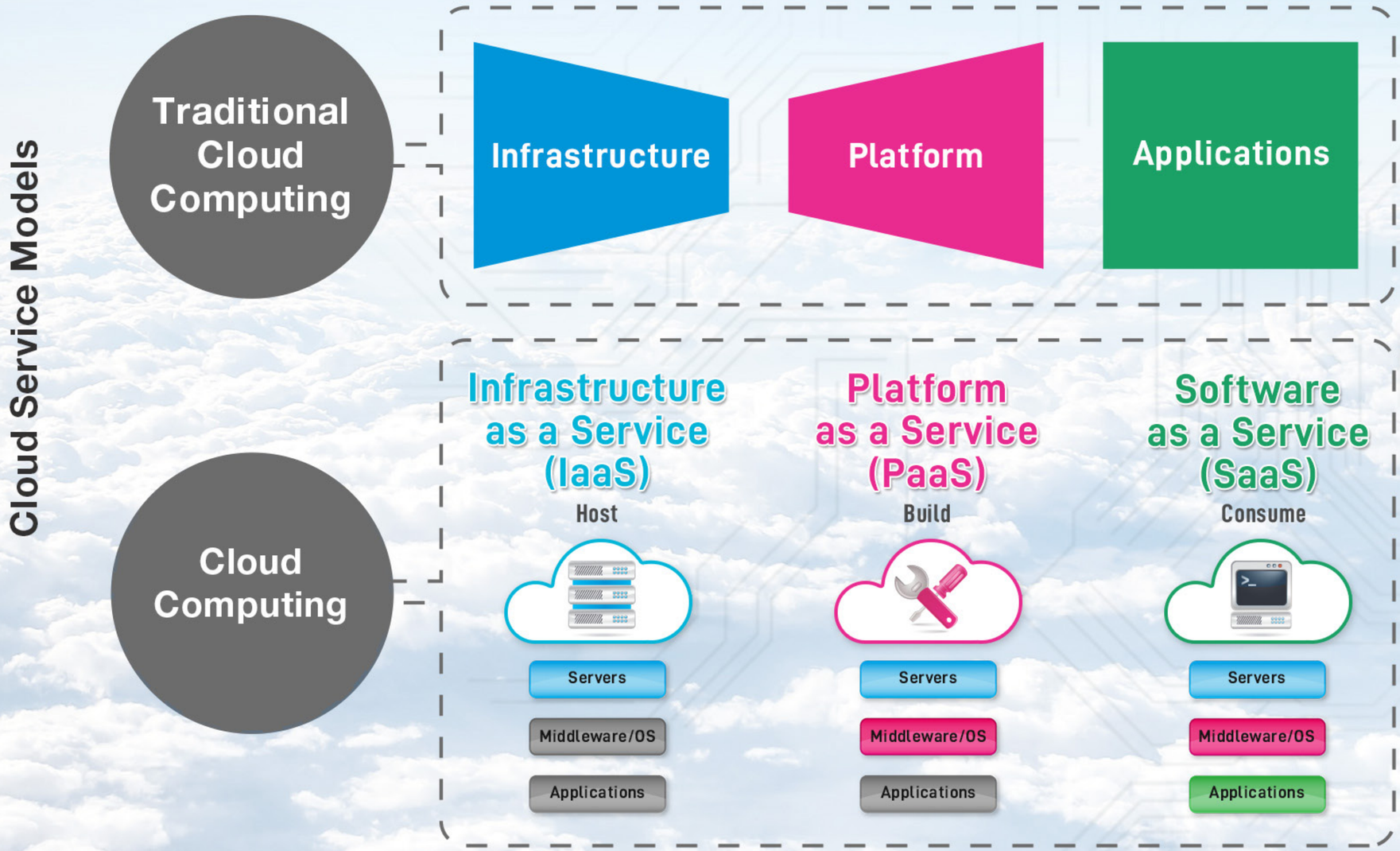
Private Cloud is typically a cloud deployment model solely operated by an organization and can also be managed by a third-party. A private cloud model with infrastructure managed by a third-party (particularly a public cloud provider) is termed as 'virtual private cloud'. Giving freedom on network bandwidth, security and legal hurdles, a private cloud ensures high security, accountability and resilience. Here, the ability to control and manage infrastructure, resources, costs and technology decision-making completely lies with the host organization. Typically for large enterprises (and also for other firms), the private cloud incurs high capital investment and also demands time for complete deployment.

Hybrid Cloud is the combination of two or more cloud models bound by a single entity that allows application and data portability. There is also another definition that terms Hybrid Cloud as a combination of both private and public cloud within an enterprise, with the latter as a backup or for load balancing. In this type of hybrid model, enterprises store highly business-critical information in private cloud and less critical ones in public cloud.

Other Cloud deployment models include Community Cloud, HPC Cloud, Multi-cloud, Big Data Cloud and Distributed Cloud.

Cloud Service Models

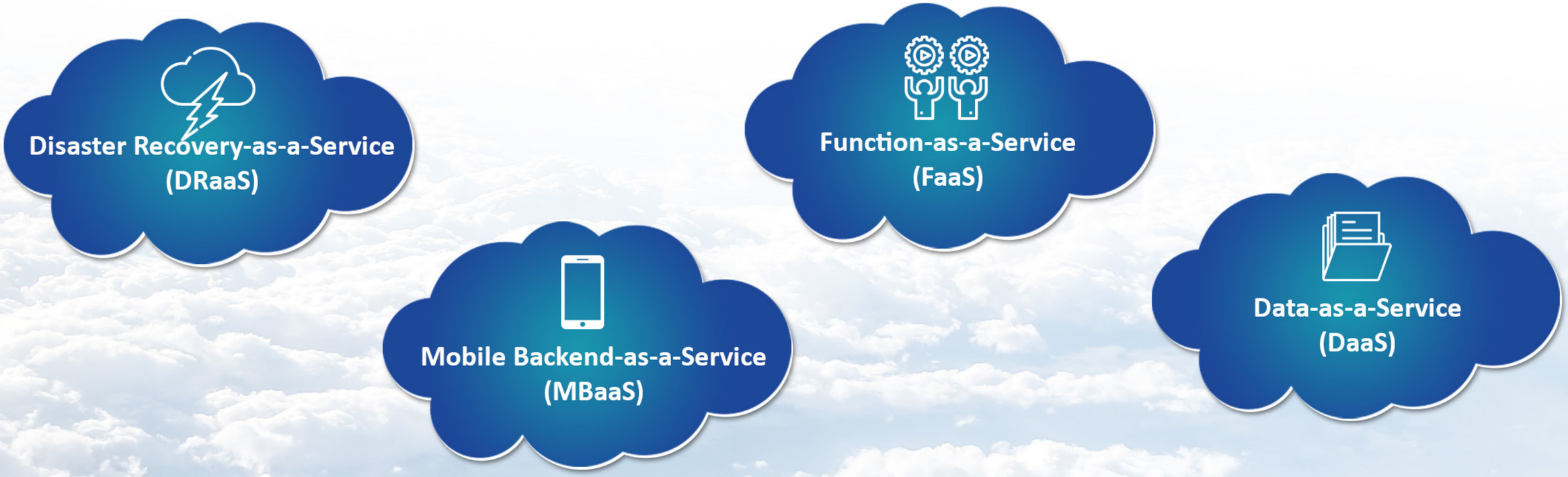
Traditional computing environments are available in three different models as Application, Platform and Infrastructure. Whereas, cloud computing presents a 'as a service' model.



Whereas, Cloud stands unique in its service offerings:

S.no	IaaS	PaaS	SaaS
1	Infrastructure as a Service	Platform as a Service	Software as a Service
2	Emerged out of dire need for computing resources without capital costs and maintenance hurdles	A step above IaaS, where consumer defines configurations and provider follows in an operating environment (OS, apps)	A step above PaaS, where consumer has provider-created applications running on cloud infrastructure
3	No control over underlying infrastructure; OS, storage and applications are manageable with limited control on network components	No control over underlying infrastructure including network, servers, OS and storage; deployed applications and (possibly) application hosting environment configurations are manageable	No control over underlying infrastructure including network, servers, OS, storage and individual applications, with possible exception to user-specific app configuration settings
4	Computing resources operated and managed by others, replacing the need for own hardware maintenance	Managing, owning of hardware burden and OS software can be handed over to service provider	Service providers can handle complete software requirements

5	Minimized infrastructure costs	Service provider is responsible for management and run-time monitoring with the middleware support	Might need different applications from different vendors, resulting in possible integration concerns
6	Will not have dedicated computing resources	Applications need separate deployment mechanism	Subscription-based software licensing; software hosted centrally



Besides, there are also other requirement-specific cloud service models such as Disaster Recovery-as-a-Service (DRaaS), Mobile Backend-as-a-Service (MBaaS), Function-as-a-Service (FaaS) and the advanced Data-as-a-Service (DaaS).

Cloud Computing for Business

We have seen an overview of cloud computing as a combination of its deployment and service models. Now, it's time to understand how cloud, as a technology solution, benefits business in real-time.

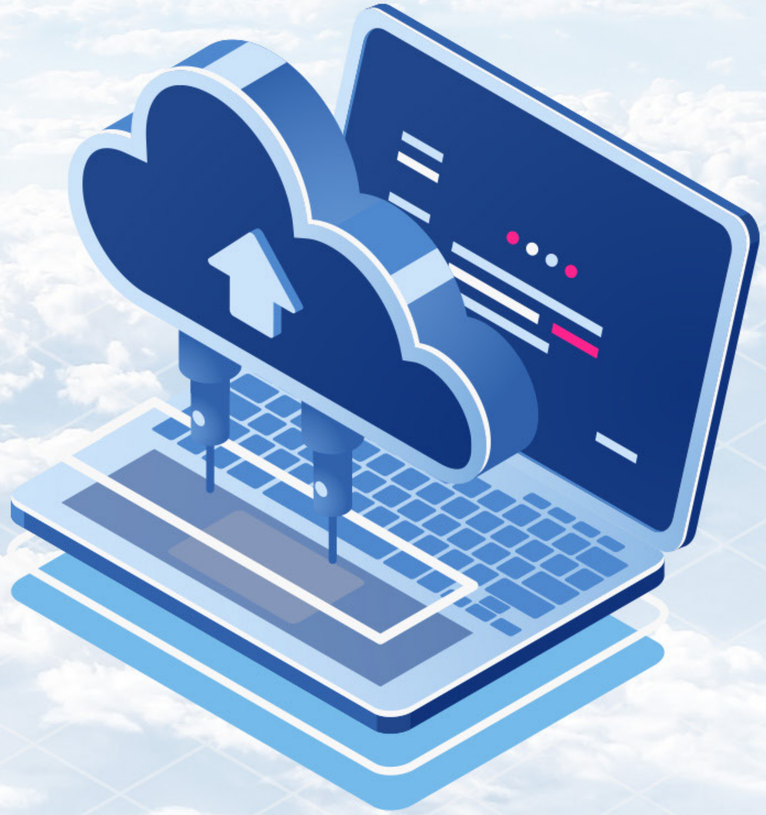
Setting Up Cloud Vision

Setting up business vision is a mission that requires detailed analysis and planning of what your business demands.

Same is the case here!

Be it setting up a public cloud for your extended external services or a private cloud for internal business activity, setting up a cloud vision for your IT business requires:

- **Understanding of Business Context**
  - » Assessment of IT Service Portfolio
  - » Service-level Agreements
  - » Business Goals
- **Strategic Planning**
  - » Services under consideration
  - » Analysis against external offerings
  - » Complete Business Case Analysis
- **Cloud Suitability**
  - » Service Costs (varies with deployment model)
  - » Scope and Complexity



- Collaboration and Information Restrictions
- Risk-Reward Balance

Setting up a cloud computing vision forms the foundation for cloud computing strategy and cloud migration.

Cloud Risk Assessment and Security

The advent of cloud computing has brought about a significant change in IT business practices, making almost every critical aspect of IT process (including infrastructure, platform, application, data and more) on-demand and virtual.

While this part of cloud has been an advantage, it's also important for firms to understand how things work behind 'as you have multiple technology layers operating together'.

This is where you need risk and security assessment!

The Information Systems Audit and Control Association (ISACA), an international association focused on IT Governance, in its publication on 'Cloud Risk Assessment' states:

The benefits of cloud computing (specifically Software as a Service [SaaS]) over in-house development are clearly articulated and well known. A consensus on the risk of cloud computing is, however, more difficult to achieve because the industry is lacking a structured framework for risk identification and assessment.

The statement tells us how important risk assessment is, if you are going for cloud implementation. According to ISACA, businesses are struggling in identifying and going with a proper road map for cloud implementation.

"Paradoxically, from a small to medium-sized enterprise perspective, migrating to the cloud may in fact mitigate risk," ISACA states.

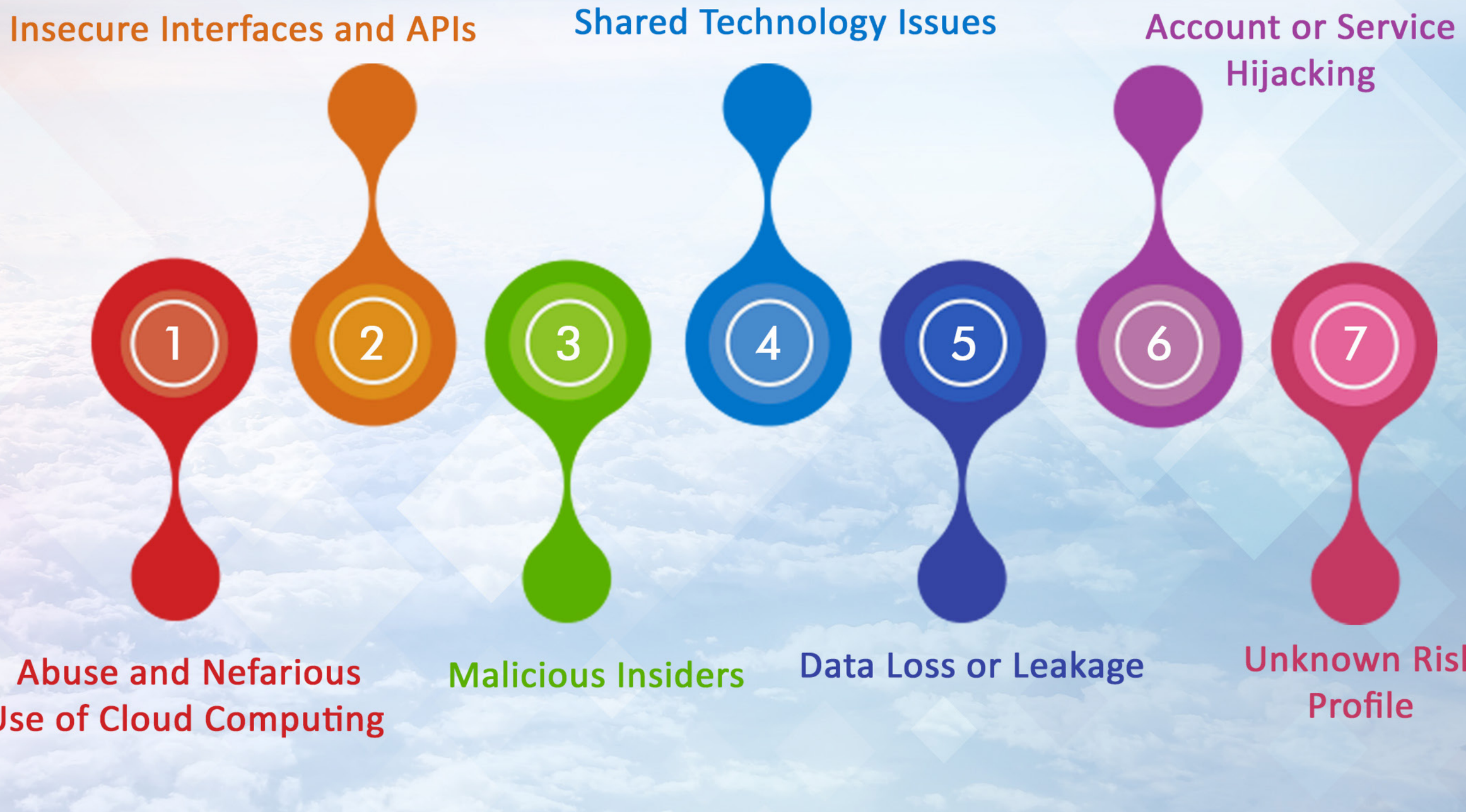
Besides ISACA, various other globally-leading technology associations have listed top possible cloud-specific risks over the years.

European Network and Information Security Agency (ENISA)

ENISA's 2009 'Cloud Computing: Benefits, Risks and Recommendations for Information Security' report has listed following as **'Top 9 cloud-specific risks'** (out of 35 identified):

Cloud Security Alliance (CSA)

CAS's 2010 report titled 'Top Threats to Cloud Computing V1.0' identified the following as **'Top 7 cloud-specific risks'**:



Open Web Application Security Project (OWASP)

OWASP's 2011 report titled 'Cloud - 10 Project' identified following as **'Top 10 cloud security risks'**:

As a solution to potential cloud risks, ISACA recommends **'10 Principles of Cloud Computing Risk for Cloud Risk Assessment Framework'**:

1. Executives must have oversight over the cloud
2. Management must own the risks in the cloud
3. All necessary staff must have knowledge of the cloud
4. Management must know who is using the cloud
5. Management must authorize what is put in the cloud
6. Mature IT processes must be followed in the cloud
7. Management must buy or build management and security in the cloud
8. Management must ensure cloud use is compliant
9. Management must monitor risk in the cloud
10. Best practices must be followed in the cloud

These ten principles of cloud computing risk also provide a framework for cloud computing migration.

Improving ROI with Cloud

Improving Return on Investment (ROI) in any business means:

Adoption of cloud services have been proven successful, over traditional IT models, in achieving all the aforementioned aspects that mean **‘better ROI’**.

Many IT organizations including leading industry players reported such benefits in cloud-shift trend and cloud strategies.

But the fact to be noted is all the four are achievable, but not at a time!

While public cloud decreases investment and increases cost, private cloud works otherwise.

Cloud solutions contribute to ROI by influencing key factors such as investment, revenue, cost and time, which directly reflect in Productivity, Speed, Scalability and Quality.

Be it setting up a public cloud for your extended external services or a private for internal business activity, setting up a cloud vision for your IT business requires:

- **Productivity:** Maximum business with minimal IT
  - » Effective Resource Utilization
  - » Usage-based Pricing
  - » Specialty in Skill and Economies of Scale
- **Speed:** Improved Operation Speed
  - » Faster Deployments
  - » Lifetime Cost Models
  - » IT Asset Management
- **Scalability:** Enhanced Scale of Operations
  - » Entry to New Markets
  - » High-Value Services
  - » Enhanced Scope
  - » Maturity to become a Cloud Provider
- **Quality:** Service-driven Business Margin
  - » Quality of Service
  - » Build Service Value
  - » Rapid Cost Reduction

Overall, revenue can be improved through enhanced features and quality, which often means higher prices and additional costs.

So, the secret of **‘better ROI’** lies in **‘defining value to the business’**!

Cloud for SMBs – A Special Advantage

Cloud technology arrived as a boon for Small, Medium Businesses (SMBs), who usually rely on minimum capital budgets and less personnel.

Avoiding the need for upfront investment, cloud simplified IT functioning of SMBs by offering them scope to source services from external providers, as and when required.

A single cloud service provider can go beyond individual SME and cater to the business needs of hundreds of SMEs!

In this case, the organization sourcing services from a cloud service provider for internal operations plays the role of IT service broker facilitating pay-per-use or on-demand solutions.

Cloud value proposition to SMEs can be in different forms, summarized as:

- Provisioning ready-made IT capabilities at the time of their market-entry
- Deployment of standard application stack to start-off
- Reduced time-to-market
- Faster customer reach-out

Cloud solutions help SMEs market their products rapidly and reach out to wide range of customers in a short period. This gives them an advantage of immediately-running business without having to wait for in-house IT set-up.

The rapid time-to-market not only gives them scope for faster customer reach, but also increases their competitive capabilities.

Besides, availability of on-demand and wide range of IT services on cloud relieves SMEs from worrying about seamless and unlimited services.

All this directly transforms into a major advantage for SMEs i.e., minimized Capital Expenditure (CAPEX) on IT assets, as cloud providers can rent them as and when required.

Though there is a shift towards Operational Expenditures (OPEX), consumers will have a choice to reduce or optimize costs as per needs - The key objective of cloud computing!

Besides, mobility is another key advantage that SMEs will require to meet the needs of their scattered ecosystems. Cloud ‘over-the-network’ services answer this too!

What more? Cloud adoption has already proven to have supported SMBs in driving their focus on to business expansion without having to worry on provisioning of IT services and upfront investment for IT set-up.

Cloud Computing Governance

Adopting an all-new environment through complete transformation definitely needs strict governance.

A well-defined governance can either drive you in an already-chosen path or help you find an appropriate path to go with.

Moreover, addition of more sophisticated options to the service portfolio calls for new stakeholders, more expectations and necessary measures to achieve goals.

As a result, business competitiveness, flexibility and agility turn out to become more compelling factors alongside IT requirements. Then grows the scope for potential risks and opportunities, naturally!

Same is the case with cloud!

A full-fledged cloud adoption is not an easy path and is definitely a combination of risks and opportunities.

So, to ensure a successful cloud transformation and gain a complete control over the new cloud environment, you will definitely need a 'Cloud Computing Governance Framework'!

The Cloud Computing Governance Framework provides a well-defined set of guidelines on the cloud paradigm applicable across all the possible IT-related areas in an enterprise.

There are a wide variety of openly-available (*internationally-acclaimed standardizations) and custom (provided by individual cloud providers*) set of guidelines related to Cloud Computing Governance.

Cloud Market Overview

Cloud is today the most trending buzzword in IT industry. With its on-the-go services and budget-friendly options applicable to organization of any size, Cloud is enjoying deeper penetration globally.

Here are some interesting facts about the global cloud computing market:

- The global cloud computing market is expected to touch a USD 411 billion revenue in 2020, and reach USD 623.3. billion by 2023 at 18 percent CAGR
- The global cloud IT infrastructure spending is expected to grow at a 11.2 percent CAGR to reach USD 82.9 billion in revenue by 2022, holding 56 percent share of the overall IT infrastructure spending
- Total IT infrastructure spending (server, enterprise storage and Ethernet switches) for deployment in cloud is poised for a 10.9% Y-o-Y growth rate
- 60 percent of end-users are preferring cloud over on-premise
- Cloud shift trend is going to have impact on more than USD 1.3 trillion worth IT spending by 2022
- Cloud adoption rate has been witnessing rapid growth supported by cloud-related spending, which is expected to grow more than 6 times the rate of general IT spending through 2020
- Global public cloud services market is expected to grow from USD 145.3 billion in 2017 to reach USD 278.3 billion by 2021

- Cloud system infrastructure services (IaaS) is the fastest-growing segment of the global cloud market, poised to grow 27.6 percent in 2019 to reach USD 39.5 billion revenue, up from USD 31 billion in 2018
- Spending on Infrastructure-as-a-Service (IaaS) is expected to grow from USD 39.5 billion (in 2019) to USD 63 billion through 2021
- Software-as-a-service (SaaS) remains the largest segment of the global cloud market, with revenue expected to reach USD 85.1 billion in 2019 at a 17.8 percent growth

Worldwide Public Cloud Service Revenue Forcast (USD Billion)

	2017	2018	2019	2020	2021
Cloud Business Process Services (BPaaS)	42.2	46.6	50.3	54.1	58.1
Cloud Application Infrastructure Service (PaaS)	11.9	15.2	18.8	23.0	27.7
Cloud Application Services (SaaS)	58.8	72.2	85.1	98.9	113.1
Cloud Management end Security Services	8.7	10.7	12.5	14.4	16.3
Cloud System Infrastructure Services (IaaS)	23.6	31.0	39.5	49.9	63.0
Total Market	**145.3**	**175.8**	**206.2**	**240.3**	**278.3**

BPaaS = business process as a service; IaaS = infrastructure as a service; PaaS = platform as a service; SaaS = software as a service

Note: Totals may not add up due to rounding.

Source: Gartner (September 2018)

- In 2018 (by providers), 80 percent of enterprises chose Amazon Web Services (AWS) as their preferred cloud platform for running apps and experimentation, followed by Azure (67 percent) and GCP (18 percent), among others
- As of 2018, AWS adoption rate among enterprises increased from 59 percent to 68 percent, while it was from 43 percent to 58 percent (at a 35 percent CAGR) for Azure
- By region, almost all regions witnessed a double-digit growth in the cloud IT infrastructure market in the Q2 of 2018, with APAC recording the fastest revenue growth of 78.5 percent, year-on-year
- Manufacturing Execution Systems (MES), Quality Control and Computer-Aided Engineering were identified as the three most widely-adopted systems in cloud by discrete and process
- Discrete Manufacturing is poised to take the lead above all industries in public cloud spending (at USD 19.7 billion), as per 2018 forecasts
- Not just cloud, new opportunities in digital business such as IoT are going to contribute to the cloud shift trend
- Lack of cloud expertise could cost USD 250 million loss for enterprises, annually, says London School of Economics 2017 study

"*Through 2022, growth in enterprise IT spending for cloud-based offerings will be faster than growth in traditional (non-cloud) IT offerings, making cloud computing one of the most disruptive forces in IT markets since the early days of the digital age,*" says Gartner in its 2019 report on **'Cloud Shift Impacts on All IT Markets'**.

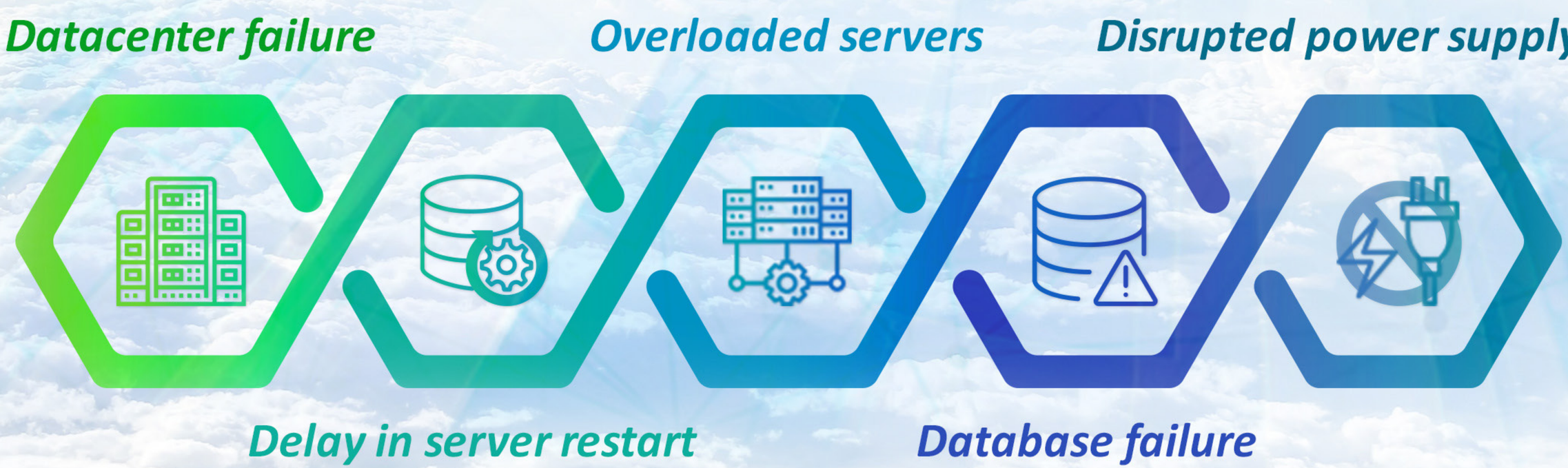
Cloud for Disaster Recovery – The Hot Trend

We are in a world where success and failure take an equal portion.

This means a lot to IT industry that has been witnessing many technology advancements that also brought along relevant risks.

Alongside positives like increased innovation and enhanced productivity, negatives like process failures and unexpected outages as a result of disaster events (human or natural) continue to pose serious challenges to IT industry.

Some of the most commonly-reported disaster events include:



As a result, Disaster Recovery has become one key part of corporate agenda for every firm today.

There are safeguarding options like ‘Backup’ but do have limitations. While ‘Backup’ options avoid the risk of data loss, a perfect DR strategy avoids the IT downtime all together.

So, every CIO/CTO today is keen about having a DR system in place, and Cloud remains their top priority!

A Forrester report on ‘cloud-based DR’ found more than 60 percent of its survey respondents considering DR as their high business priority, with many opting for cloud DR-as-a-Service (DRaaS) over on-site or traditional DR services.

Cloud-based DRaaS brings in high-speed data links, redundant operating systems and application licenses to address downtime issues under the scope of physical and virtual infrastructure.

Various other real-time scenarios have also proven that the cloud and DR Management software have worked effectively in realizing business continuity and high value at low investment.

DRaaS advancements have also allowed businesses to even run hybrid IT production systems across their data centers for regular operations as well as to create replicas of the same as and when needed.

The hybrid cloud DR model eliminated the need for secondary DR sites, alongside delivering traditional value-offerings and extending solutions even to remote locations.

Overall, Cloud-based DR model made a big difference in achieving key DR objectives ‘Recovery Point Objective (RPO) and Recovery Time Objective (RTO)’ at minimized costs, which were once associated with huge investment in network and server infrastructure.

The Conclusion

Cloud has become a most sought-after technology solution for every IT firm, irrespective of size. Be it market penetration or business expansion, cloud can do that at a rate faster than one can imagine.

Adding to the scenario, digital transformation is widening the cloud presence across markets, making it omnipotent! Moreover, new-age IT practices like DevOps are paving way for next-level cloud penetration.

Get ready to witness the new wave of cloud-next trend driven by almighty Artificial Intelligence, Machine Learning and IoT capabilities!

Get in Touch!

Veritis has been among the early Cloud service providers and has more than a decade-long experience in dealing with organizations of various industry verticals, including those in the Fortune 500 list.

You could be our next esteemed partner!

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