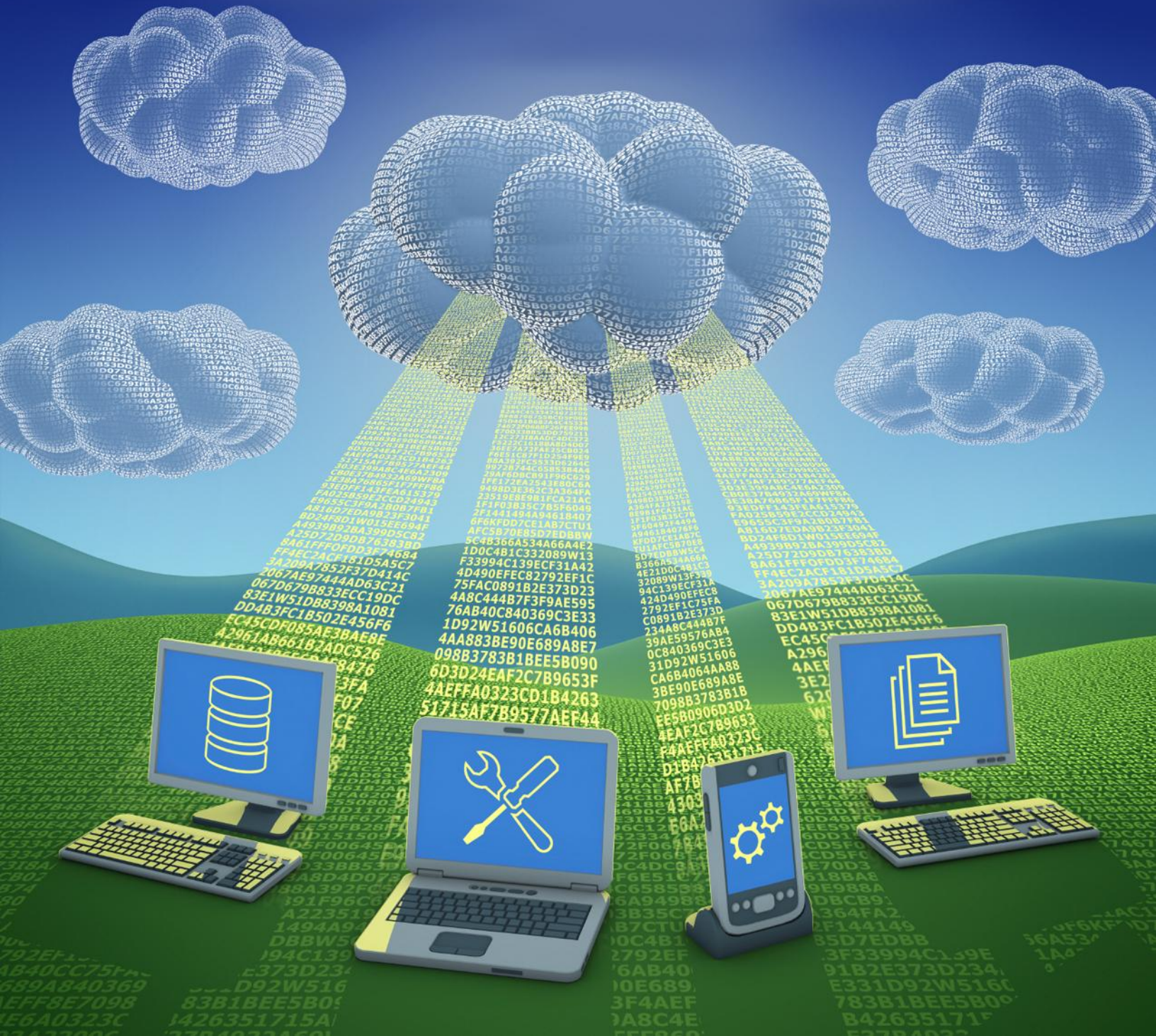


# Predict, forecast and analyze your business in the cloud



Transforming Data into Intelligence



## Executive Summary

With today's stagnate economy, it is imperative that businesses look at all aspects of their operations to find ways of increasing efficiency and productivity, while at the same time reducing their operating costs. If that wasn't enough, businesses must stay competitive and flexible to deal with today's volatile market shifts in consumer demand, technology trends, and industry demands. In order to gain a lasting competitive advantage that will support all current and future technology needs, more and more business are beginning to utilize the virtually limitless power of cloud computing. While cloud computing is not a new concept, its growing adaptation has led to innovative opportunities for small start-ups and Fortune 500 companies. Cloud computing has changed how classical resources are provisioned and has created a low cost, scalable, collaborative environment where custom infrastructure is generated on demand.

As the convergence of voice, video and data continue, more and more stress is being placed onto current businesses IT infrastructure, leading professionals to struggle with resource management. This is especially true when it comes to resource intense applications that aim to deliver quantitative answers through the use of business analysis and analytics. With cloud computing, resources can be provisioned and synched with organizational demands on the fly. Cloud computing is truly an "on demand system", in that, businesses pay for and use only what they need when they need it. This encompasses the complete infrastructure of an organization, including: software, services and hardware, and the consumption of these resources.

Cloud computing provides software, platform and infrastructure as a service, that can be used in part or in whole as a solution. It allows organizations to pay for only what they use and it provides a unique testing environment for new software and services without the commitment of ownership. Cloud computing can be a collaborative environment, where company resources are omnipresent and easily accessible from almost any device, regardless of location - It is a on-demand self service that offers ubiquitous network access for both public and private users. With the flexibility, minimal cost, and virtually infinite power, it should come as no surprise that many already utilize the cloud for business intelligence.

As data streams continue to grow and more information becomes available through social media, data mining and sentiment analysis - so does the power needed to transform this data into intelligence. Business intelligence has changed the way organizations treat their data, with many coming to the realization about the power it contains. The cloud offers organizations of any size an opportunity to take advantage of BI as-a-service (BlaaS) in a cost efficient and flexible manner that will drive innovation. Whether the resources are consumed in house or on the go, BlaaS will be able to deliver answers to decision makers when and where they need it.

Scalable Systems brings unparalleled expertise in business intelligence and performance with specialized knowledge in business data management and analytics. We can design, develop, and support business intelligence initiatives such as scorecards, dashboards, enterprise reporting, OLAP analysis, and predictive analysis by way of popular business intelligence products and tools. With our latest solution framework called Precision Intelligence we offer technology platforms such as mobile, cloud, social and big data to harness and empower organizations to break the barrier of competitiveness and succeed through agile and smarter decisions. As part of our cloud offering we offer end to end consulting and solutions in Business Intelligence as a service.

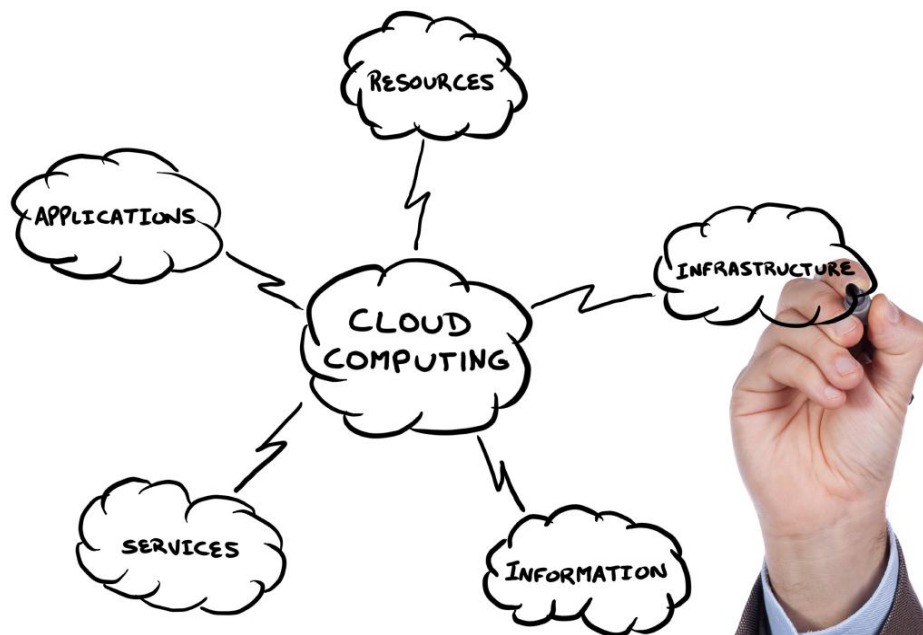
## What is cloud computing

Cloud computing is a collection of scalable, on-demand networked resources of applications, services and storage that can be virtualized on almost any device. More and more organizations are beginning to realize the benefits of cloud computing and are further distancing themselves from their competition. The cloud can reduce overall operating cost, give the ability to start new projects and business ventures without the required infrastructure, and support a growing mobile workforce by making company resources omnipresent. Cloud computing is not a new concept, but the development and implementation have exploded over the past few years and we have yet to see its true potential. Leaving the possibilities of innovation limitless and with projected adoption rates of the cloud, some say it's the future of computing.

The cloud is more than the next new wave of technology or a collection of shared resources. It is a pervasive environment for business collaboration, creation and innovation. It is of no surprise that business intelligence has made its way into the cloud and is offering scalable, flexible, low-cost solutions for business of all sizes and industry. The cloud gives you the ability to pick up where you left off regardless of device, pay for only what you use, enhance collaboration between employees regardless of location and create a resilient and efficient IT infrastructure. Being able to deliver services, platforms and infrastructure on demand with rapid elasticity can drive innovation and accelerate multifaceted growth. The unique elements that compose the clouds architecture have changed the way we do business and use technology.

The National Standards Institute for Technology defines cloud computing as:

A model for enabling ubiquitous, 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.



## What is cloud computing

The cloud is composed of essential characteristics that help define its unique architecture through several types of offered services and multiple deployment methods for delivery. There are a growing number of providers, community support and third party development to ensure the successful implementation of your cloud solution. Whether the organization is a new start-up or a large enterprise looking to enhance its data analytics, the cloud can be tailored to your individualistic needs. The following are the fundamental characteristics of cloud computing unique architecture:

**On-demand self-service:** A user would be able to access cloud resources such as application, services, and storage automatically without human interaction from the provider. This allows a consumer to pay only for what they use, schedule processing and storage needs, and managing services and applications without any need for technical support from the provider.

**Ubiquitous network access:**

Networked resources are available through high speed standard communication protocols, making cloud services omnipresent.



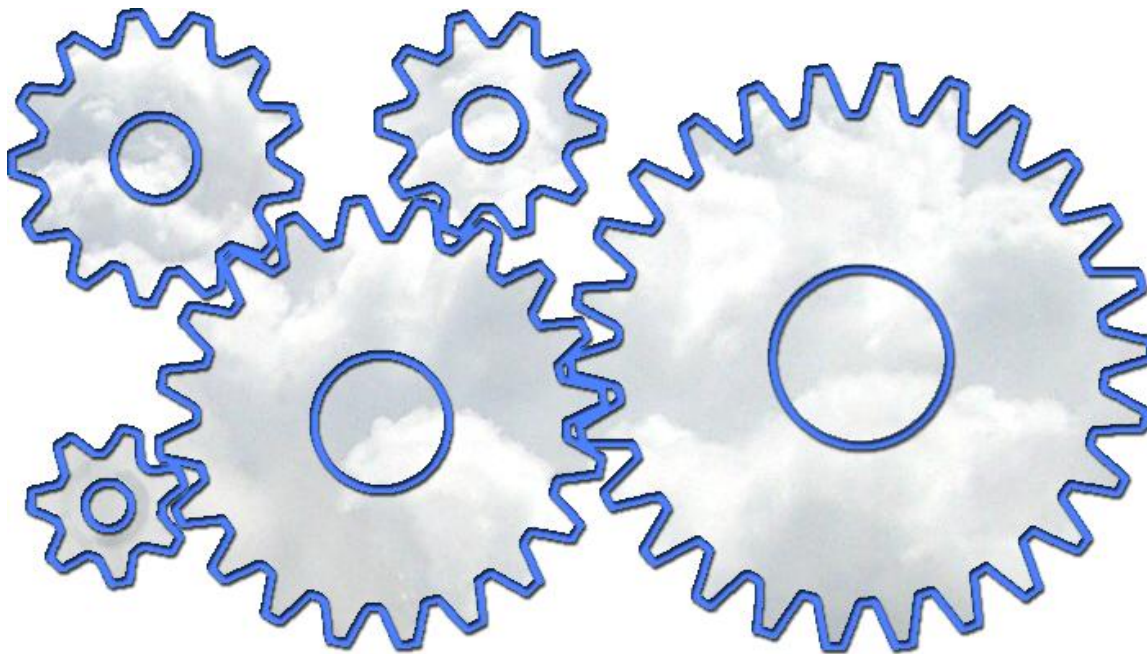
**Resource pooling:** The cloud provider will pool multiple physical servers for processing, memory and storage that can be dynamically distributed and tailored to consumer demand. As a result of this design, the consumer has “no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter).”<sup>1</sup>

**Rapid elasticity:** A key function of the cloud design: Being able to custom tailor specific resources to meet on-demand requirements and provide efficient flexibility with current use and future scheduled acquisitions. For the consumer to accurately pay for what they use while having the provision of limitless resources is a powerful image of how the cloud can benefit any business.

**Utility Pricing:** The architecture of cloud computing allows for resources to be scaled on-demand and with the service nature of the cloud, effective use of resource monitoring is essential to provide a transparent billing per session environment. As stated by NIST “Cloud systems automatically control and optimize resources used by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.”<sup>1</sup>

## What is cloud computing

The cloud can be delivered in three models of service, which an organization can combine to supplement in whole or part of a solution. When it comes to cloud business intelligence, ideally, all three service models are utilized to provide the complex capability that business intelligence offers. Organizations looking towards cloud BI solutions should be focused on identifying which areas of an organization will have the greatest impact, what problems are you trying to solve and what goals do you plan to achieve. Understanding the technical architecture of your cloud BI solution and how it can coincide with your organizations existing infrastructure is essential to successfully implementing and expanding business intelligence within your organization. The three service models that are offered in cloud solutions are defined by NIST as the following:



**Cloud Software as a Service (SaaS)** — The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

**Cloud Platform as a Service (PaaS)** — The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created with programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possible application hosting environment configurations.

**Cloud Infrastructure as a Service (IaaS)** — Rent processing, storage, network capacity and other fundamental computing resources. The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

## What is cloud computing

The cloud has four models which can be deployed internally or externally and consist of one or more models. Deployment models can be broken down further into two separate groups. Companies such as Amazon and Microsoft offer end-to-end solutions where a user is restricted to a vendor's cloud stack. The second is Red Hat's Cloud Foundations which offers a comprehensive set of open source products that can be used with third party vendors. As stated before it is imperative that organizations ensure compatibility of their IT infrastructure with their chosen cloud provider. The five cloud deployment models are defined by NIST as:

**Private cloud.** The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.



**Hybrid cloud.** The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing)

**Community cloud.** The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.



**Public cloud.** The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.

# Why cloud computing for business intelligence and data integration

The cloud can be a game-changer for BI, as it makes complex data analytics a reality for businesses of all sizes. Organizations need to be agile to take on and challenge the dynamic changes that happen in today’s evolving market. The cloud makes BI solutions affordable and easily accessible to anyone who wishes to transform their data into intelligence. With the advent of cloud-based BI, organizations can deliver critical analytics from top level executives to front end employees at a fraction of traditional costs. Important decisions should not be restricted to one place, neither should your data. By moving your data to the cloud you are removing traditional restrictions associated with the “office” nature of doing business. In addition, you are reducing your risks of infrastructure failures, cost of running your own virtualization platform and gaining higher availability, redundancy and resiliency of your data. In the cloud, business can be conducted from anywhere, anytime; making a pervasive business ecosystem where everyone is “in-the-know”.

The cloud greatly reduces the overall cost of implementing a business intelligence solution by removing the traditional restrictions of complex hardware and software. Furthermore, the cloud reduces the amount spent on hiring and training personnel to perform all the necessary configuration and maintenance, which in turn, frees up resources to be dedicated to promoting the development of intelligence through data analytics. Business Intelligence as-a-service (BlaaS) provides an immediate scalable and low cost analytics solution that can be delivered to a large diverse company accessible through a web browser. Information can be stored and processed in the cloud by various analytic applications. Reports, scorecards and dashboards can be generated and delivered, all on a redundant and resilient IT infrastructure. Organizations will be able to focus on managing their BI solution without having to worry about the underlying framework that holds it together.

One of the clouds fundamental characteristics and greatest cost saving features is utility pricing. Utility pricing allows organizations to explore countless possibilities while being able to manage and pay for resources used. For instance, if new applications wanted to be tested for data analysis or a practice server was needed for annual training, a organization would be able to request these resources without having to worry about the setup and configuration or software licensing. There would be no long approval process, just a few simple clicks of the mouse and resources can be acquired and discarded while only paying for what was consumed. This integrates agility within an organization as making moves and trying new things becomes less of a risk and more of an opportunity. As cloud BI development and competitions between providers continue to grow, utility pricing will drive down the cost of cloud BI which will provide more feature rich solutions and greater business opportunities. The cloud has a growing list of benefits that include: increased operational efficiencies, immediate time to market, as well as reductions in cost and capital expenditures.



## Why cloud computing for business intelligence and data integration

One area that goes hand in hand with business intelligence is the quality of the data. Data quality is the degree of completeness, validity and accuracy that enables intelligence to be developed from data. Data is collected and relied upon for operational efficiencies, decision making and organizational development. Data should be made available to the organization as a whole to promote the unity of growth across the entire enterprise. With Data Quality on Demand, the cloud is able to cleanse, match and standardize entries across the globe with prebuilt rules that can take data quality to the next level. Having unverifiable and un-trusted data can lead to bad decisions, wasted resources and inhibited growth. Data quality is critical to any organization as existing data will be incorporated with new data applications and systems that depend on data integrity to ensure business continuity.

The cloud is able to deliver another key piece of the puzzle that ties together business intelligence and data quality – Master Data Management (MDM). Cloud based MDM can provide a cost efficient and effective mechanism to provide complete, accurate, and real-time data across multiple systems. This enables organizations to manage and disseminate information across their entire operating spectrum, increasing their competitive advantage and business process by harnessing the true power of their data. Leaving data unmanaged, inconsistent, and tainted can pollute analytical processes and applications which can lead to increased operational cost and reduced ROI for data initiated projects. Accurate information is crucial for organizations to achieve long-term success in today's evolving global market.





## Why cloud computing for business intelligence and data integration



**Scalability:** Organizations must react to market demands, why shouldn't IT resources do the same? Cloud computing has the ability to rapidly scale with how much or how little an enterprise needs and works in conjunction with the utility pricing capability. Not having to constantly upgrade your companies hardware to match software and end user demand can greatly reduce future operating cost.

**Virtual Data Center:** The most valuable asset within an organization is its data. The cloud offers a physically secured, dynamic and standardized infrastructure with the highest levels of data redundancy to ensure availability. Organizations have a substantial investment in data centers that can be offset by utilizing cloud services, whether deployed internally or externally.

**Business Processes:** The cloud provides an infrastructure for improving business processes by establishing an environment of connectivity and collaborations. All those connected will be able to see the latest developments, share ideas and keep everyone in the know.

**Minimizing start-up costs:** Regardless of the size of your start-up, whether it's a training server, new department or an entirely new business, cloud computing can greatly reduce associated cost. The cloud has the infrastructure, software, storage and processing power already in place and your solution can do the same with just a few mouse clicks. Saving time, money and human resources that would traditionally be spent on new initiatives are redirected and focused on business development and growth.

**Self-Service:** Whether management of resources come from an individual or a team, they can be catered to deliver a productive work environment in a cost-efficient way by monitoring resources used, and scheduling and reserving resource capacity. Resources can be centrally configured and managed which allows groups of users within an organization to expand consumption without affecting others within policy. Attention can be focused on efficient delivery business services and resources without having to worry about the complexity of the underlying technology.

## Cloud Security

When it comes to computer security, there is no such thing as a 100% guarantee secure system and cloud computing is no different. The cloud is susceptible to the same types of security risks and attacks as traditional network infrastructure. It is imperative that an organization evaluate the security of their solution, the assets they are putting at risk, and who is responsible for incident management and liability. In addition, there are significant security concerns about moving critical business application and confidential information to the cloud as anyone with an internet connection can attempt to access your organizations resources. In order to combat these threats, security should be applied in layers to all data, applications and services offered by the cloud. Having proper and adequate security is an ongoing challenge and should not be hindered. Below are security elements that should be understood and applied to your solutions, along with some of the top security concerns for cloud computing data.



### Security Elements

**Confidentiality:** Confidentiality is the prevention of unauthorized disclosure of information to individuals or systems. For example, loss of confidentiality can occur when individuals have access to data that they shouldn't have or data is placed on an unsecure system.

**Integrity:** Integrity means that information has not been altered undetectably. Loss of integrity can occur through a man-in-the-middle attack, where a user intercepts and alters the data between the sending and receiving party.

**Availability:** Availability consists of reliability, stability and prevention of disruptions in network services or data. The purpose is to ensure that network services and data are available when requested while minimizing downtime. Downtime can stem from hardware failures, power outages, system upgrades, or denial of service attacks. Redundancy is always a part of availability; if original data is altered or corrupted its integrity has been comprised and can no longer serve its purpose with accuracy.

**Authorization & Authentication:** Authentication is verifying all participating parties as who they claim to be. This can be done by passwords, one-time tokens, digital certificates or multi-factor credentials. Authorization is ensuring that services, applications and data are only accessed by those who have been approved. When organizations choose to utilize the cloud, any services, applications or data placed therein will be accessible to anyone over the internet. Therefore it is imperative that measures are in place to manage and monitor user's access and activity within the cloud.

# Cloud Security

## Top Security Concerns



**The right to audit:** Having the ability to audit your cloud solution in whole or part, is a sure way of ensuring you are getting what you paid for, that promises are kept and most importantly security standards are adhered to.

**Storage Location:** Different states and countries have varying requirements and stipulations when it comes to regulatory compliance and personal identifiable information. Organizations should be aware of legal requirements, establish liability and act with due diligence.

**Security Incidents:** If a security incident occurs, what are your provider's incident response procedures? What support will you receive? Are there liability stipulations in place? A release of confidential Information could wreak havoc and could result in a lawsuit.

**State of Data:** Organizations should be aware of the state their data is in at rest, in transit and in use. For example; what type of encryption is being used when the data is in storage? What secure commutation protocols are used when data is being altered? How does your data securely transverse between networks and devices. Is your data segregated from others?

**Access Control & Monitoring:** The ability to quickly manage user permissions and monitor user's activity is paramount. All of your clouds resources are available over an internet connection. By monitoring your user's activities you will be able to notice attacks such as privilege escalation. For example, a user who has been assigned read only privileges in a database is now able to alter both tables and data would not be noticed until it was too late.

**Provider Employee Training:** Within the cloud, depending on your solution, there will be varying degrees of control. You may be able to control the configuration of an application or where your data is stored, but one thing that you will never be able to control is provider employees. Computers only do what they are told and unfortunately, sometimes they are told to-do stupid things. It would be wise to review what training your provider's employees endure during the tenure as these individuals will be the ones to manage in whole or part of your solution.

## Future of cloud computing and data integration

As more BI projects utilize cloud services, organizational requirements will continue to drive cloud business intelligence into the next generation of higher levels of service and value. The future of cloud business intelligence and analytics is expected to take off. IDC predicts a compounded annual growth rate (CAGR) of 22.4% through 2013. In a recent IDC survey, 50 percent of respondents said it was highly likely they would pursue the public cloud for BI/analytics and nearly 70 percent said it was likely they would pursue a private cloud deployment.<sup>2</sup> At a recent conference, IDC pointed to the imminent convergence of three of the biggest technology trends that face organizations today. Mobility, cloud computing and intelligent industries will combine to perform zettabytes (millions of terabytes) worth of calculations, making data analyses and analytics paramount. With the advent of the 5th wave of computing, more enthusiasm can be seen with mobile business intelligence and the use of cloud resources.

Brian Gentile, chief executive officer at Jaspersoft says: “Typically, a cloud-based BI platform is used to solve one of three primary customer needs:

1. **Horizontal BI tool:** to deliver standalone, internally facing reporting and analysis applications -- using a traditional relational database (or data mart) as the primary source data system.
2. **Application framework:** or pre-built reporting and analysis templates for systems integrators to use for assembling customer-specific solutions more quickly. These solutions are probably function or domain-specific and contain reusable components and application logic (but are assembled uniquely for each customer).
3. **Development platform:** that enables embeddable, externally-facing applications that solve a function-specific data analysis problem (for example, CRM analytics, financial analytics, or supply chain analytics). In this case, an ISV (or an enterprise IT team with appropriate skills) would probably use the BI platform to deliver reporting and analytics as a well-defined and well-featured layer within its larger application. The result is an analytic application that solves a customer problem with minimal customization and that is ideally delivered using a software-as-a-service architecture on top of a cloud infrastructure. “



## Conclusion

Cloud computing is continually being developed, implemented, tested and improved as more applications and services are intergraded. The cloud brings in a new paradigm shift and changes the way businesses operate and use technology. Organizations will have increased agility by utilize the latest technology supported by teams of experts while paying just for what is used in a predictable, cost controlled way without significant investment. Finding the right cloud solution cannot be achieved overnight and may not lie within a single provider. Business intelligence, data quality and master data management are migrating to the cloud to provide a low cost scalable solution for organizations to embrace and maximize the power of their data. Different organizations will have different definitions and requirements for their data, but it ultimately boils down to how your data is being used. Data is an organization's most valuable asset and must be usable for constant growth.

At Scalable Systems we view our approach to customer data as an art form - because it is both a creative and constantly evolving process. Rather than merely cleansing and organizing your database, our preference is to continually nurture, organize, cherish, and maintain your data to ensure it does not become toxic at any point now or in the future. With our expertise in data model architecture, database administration, data migration, sound database development, data quality framework, and master data management, we provide holistic and long-term solutions for the most important asset of your organization – Data.

With our established history of expertise in data management and integration, Scalable Systems can assist in all of your cloud based initiatives. Whether you are looking for business intelligence, master data management, data quality control, data analytics and reporting or complete custom solutions that utilize all layers of the cloud, our consultants can provide an unmatched solution that will drive your organization to the next level. Transforming your data into intelligence that can be custom tailored and delivered to anyone and everyone by using the power of the cloud.



## References

1. The NIST Definition of Cloud Computing (Draft) National Institute of Standards and Technology. U.S. Department of Commerce. Peter Mell, Timothy Grance. Jan 2011
2. IDC survey and presentation “The Maturing Cloud: What the Grateful Dead Can Teach Us About Cloud Economics”, Copyright 2010 IDC, Presenters Frank Gens, SVP & Chief Analyst and Amy Konary, Research Director of Software Licensing & Provisioning, April 6, 2010

## About Scalable Systems:.

Scalable Systems is a global software consulting, development and IT outsourcing company providing both onshore and offshore software solutions and integration services to business enterprises around the globe. Scalable Systems has proven expertise in encompassing low cost, but high quality and reliable software solutions and services in areas like Data Management, Business Intelligence, Content Management and Application Development.

**Scalable Systems**

Email: [info@scalable-systems.com](mailto:info@scalable-systems.com)

Web: [www.scalable-systems.com](http://www.scalable-systems.com)

Copyright © 2008 Scalable Systems. All Rights Reserved.

While every attempt has been made to ensure that the information in this document is accurate and complete, some typographical errors or technical inaccuracies may exist. Scalable Systems does not accept responsibility for any kind of loss resulting from the use of information contained in this document. The information contained in this document is subject to change without notice. Scalable Systems logos, and trademarks are registered trademarks of Scalable Systems or its subsidiaries in the United States and other countries. Other names and brands may be claimed as the property of others. Information regarding third party products is provided solely for educational purposes. Scalable Systems is not responsible for the performance or support of third party products and does not make any representations or warranties whatsoever regarding quality, reliability, functionality, or compatibility of these devices or products.

This edition published August 2008