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Enterprise Application and Delivery in Cloud Computing

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ABSTRACT: This paper aims to refer a computing environment residing behind a firewall that delivers software, infrastructure and platform services to an enterprise. It is about various applications like Salesforce, SAP etc. which use cloud computing. Cloud computing is an emerging paradigm that allows users to conveniently access computing resources as pay-per-use services. Whereas cloud offerings such as Amazon's Elastic Compute Cloud and Google Apps are rapidly gaining a large user base, enterprise software's migration towards the cloud is still in its infancy. For software vendors the move towards cloud solutions implies profound changes in their value-creation logic. Not only are they forced to deliver fully web-enabled solutions and to replace their license model with service fees, they also need to build the competencies to host and manage business-critical applications for their customers. Modern enterprises are entering the age of the connected customer. Today, an enterprise's connections with their customers and employees offer enormous value from streams of real-time data which is vital for day-to-day IT operations.

KEYWORDS: Cloud computing, SAP, Enterprise systems, Enterprise resource planning (ERP), Customer relationship management (CRM)

I. INTRODUCTION

Cloud computing typically delivers Web services, providing access to components that can be easily combined to rapidly create composite web applications to meet the ever-changing needs of a business operation. Cloud services rely on service-oriented architecture that provides software developers with interfaces that leverage functionality contained within existing web applications, resulting in reduced application development time frames and lower software development costs for an enterprise. With the cloud, users can work with programs and services without having to worry about expensive or time-consuming hardware installation and infrastructure setup, nor do they need to deal with server security, uptime, and availability.[1] On-premise app development solutions are quickly becoming a thing of the past. Cloud platforms allow for better communication and real-time collaboration between teams, and for businesses interested in enterprise mobile application development, it offers something more. Cloud app development platforms are capable of doing most of the heavy lifting when it comes to creating customer apps.

Looking at the demand side, business users have more complex information technology (IT) needs than private users, since they use enterprise software, such as enterprise resource planning (ERP) or customer relationship management (CRM) systems, to support their core business operations. Given the business criticality of these systems, companies are more concerned about security and performance issues, but also face significant switching costs when migrating to new technologies. However, this slow migration towards cloud enterprise software may also be explained from the supply side, where vendors are reluctant to introduce cloud offerings. For them, cloud computing implies profound changes: Not only does it force them to deliver their solutions via the internet and to replace their software license model with service fees, it also requires them to rework their solutions to become fully web enabled and to serve multiple customers with the same instance, whereas traditional applications are installed and often extensively customized for a single customer. In terms of competencies and resources, delivering cloud applications implies that software vendors operate data centers and manage applications in addition to their traditional software development activities. This motivates our research, which investigates the shift from on-premise software to cloud services from the perspective of enterprise software vendors.



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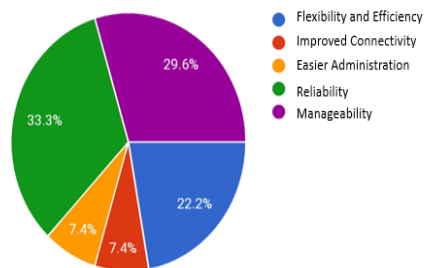
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II. METHODOLOGY

1. CLOUD ENTERPRISE INFORMATION SYSTEMS

Today business information systems are an extremely important factor that provides the necessary information for decision-making. Companies implement various software applications – from traditional (accounting, human resource, warehousing) programs to integrated software solutions (CRM, ERP, BI, etc.). [2] Information systems are expensive software, which is a large investment for companies and requires proper IT infrastructure. More vendors offer cloud based versions of business information systems. Cloud solutions allow transforming the large investment cost into operating expenses, which is suitable for small and medium-sized companies and start-ups.

The advantages of cloud business information systems over the traditional ones are:



- **Flexibility and efficiency**

There is a lower cost for using the service (system) that can vary according to the consumption based on particular needs. Flexibility is in terms of functionality – at any time, companies can choose to add new services (modules) or abandon existing.

- **Improved connectivity**

Companies can quickly provide access to the system or certain modules to its partners in order to work collaboratively that improves cooperation.

- **Easier administration**

Administration and renewal of the system is a liability of the service provider that facilitates IT departments in companies and enables their optimization[4]. Using cloud business information systems is accompanied by some problems. Cloud systems are not as comprehensive and functional as traditional solutions. There are difficulties in adapting cloud services to the specific business and its processes. The integration with already deployed applications (cloud, mobile and traditional), which have to operate in a dynamic environment, is complicated.

- **Reliability**

With a managed service platform, cloud computing is much more reliable and consistent than in-house IT infrastructure. Most providers offer a Service Level Agreement which guarantees 24/7/365 and 99.99% availability. The organization can benefit from a massive pool of redundant IT resources, as well as quick failover mechanism - if a server fails, hosted applications and services can easily be transited to any of the available servers.

- **Manageability**

Cloud computing provides enhanced and simplified IT management and maintenance capabilities through central administration of resources, vendor managed infrastructure and SLA backed agreements. IT infrastructure updates and maintenance are eliminated, as all resources are maintained by the service provider. You enjoy a simple web-based user interface for accessing software, applications and services – without the need for installation - and an SLA ensures the timely and guaranteed delivery, management and maintenance of your IT services.



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III. OVERVIEW OF ENTERPRISE SOFTWARE VENDORS AND THEIR OFFERINGS

To analyze variations in cloud business models and the differences in relation to the traditional software business, our study investigates SAP and Oracle as traditional enterprise software vendors with a dual strategy (on-premise and cloud solutions) and NetSuite and Salesforce as new entrants with a pure cloud strategy. This section introduces the selected enterprise software vendors and their offerings:

- **SAP-** It entered the market with SAP R/1 in 1973, is currently the leader in enterprise systems, with approximately 50,000 customers. The most recent version offered is SAP ERP 6, an on-premise solution that is part of the SAP Business Suite. SAP ERP comprises different modules for financials, human capital management, sales and service, procurement and logistics execution, product development, manufacturing, and corporate services. [3] It targets medium and large companies from 25 industry sectors such as automobile, chemicals, industry machinery and components, and life science. SAP's revenue streams mainly derive from licenses and services, notably annual maintenance fees that represents between 18% and 22% of the license costs. SAP has a strong network of approximately 11,000 partners, comprising value-added resellers (VAR), integrators, and software vendors (ISV), who support companies in implementing and integrating SAP ERP, as well as universities (SAP University Alliances Program). SAP also provides a development environment, the SAP Business ByDesign Studio, for extending functionalities and developing add-on applications.
- **Oracle** - Oracle Siebel CRM is an on-premise solution for mid-sized to large companies. It is used by approximately 5,000 customers [3]. Oracle Siebel CRM solutions are tailored for around 20 industries, including manufacturing, life science, technology, and insurance. This industry specialization seeks to reduce implementation time and effort. Oracle solutions' particularity is that they run on their own technology stack, such as Oracle application servers, but also their own programming languages and databases. Oracle's on-demand applications have more than 3.5 million users, and are available as a multitenant or a single-tenant solution. Specific transactions such as emails sent or modules such as e-Customer incur additional costs. Oracle CRM on demand offers a mobile version and also integrates business analytics based on in-memory technology. Support, consulting, and integration are done by internal consultants and through Oracle's partner pool.
- **NetSuite-** NetSuite is a pure cloud solution provider and claims to be the enterprise systems leader in the cloud. NetSuite ERP is dedicated to mid-sized to large companies and currently has approximately 10,000 customers. NetSuite ERP's main functionalities are accounting, manufacturing, fulfilling, billing, and payroll. NetSuite also provides a platform, Suite Cloud, which is used by a community of 4,000 developers. With tools such as workflow management, application development, and integration services, Suite Cloud helps developers create applications, which are sold through the online store SuiteApp. The latter currently contains 1,000 applications. NetSuite also has a partner network; Accenture is an official reseller, while Yammer! has developed instant messaging services, and Google has integrated its Google Apps.
- **Salesforce-** The Salesforce Platform is the fastest path from idea to impact, enabling enterprises to transform their business with apps built around their customer. Designed to empower anyone to build apps with a meta-data platform, and backed by enormous capabilities for connectivity, automation, and intelligence, the Salesforce platform is used by thousands of businesses as a key part of their enterprise application development stack. In this age of connected customers, new data is necessitating new approaches to enterprise app development. The Salesforce Platform gives you the power to design data-relevant applications that make a difference. [6] Salesforce is the leader in cloud-based customer relationship management solutions. Its main product, Sales Cloud, is used by more than 100,000 customers, from small to large companies. Sales Cloud targets specific industries such as manufacturing, government, media, and life science. In addition to its main functionalities (e.g., account and contact management, marketing, opportunity management), Sales Cloud offers a separate database (Data.com), which allows customers to manage their clients' data. Sales Cloud is strongly connected to social networks such as Facebook or LinkedIn. Salesforce does not own its infrastructure, but partners with two providers, one in the U.S. and one in Singapore. Salesforce also has a partnership with Google, which provides services that are fully integrated into this platform.

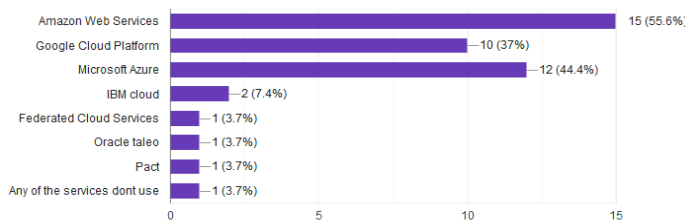
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IV. DIFFERENT CLOUD SERVICES USED BY INDUSTRIES



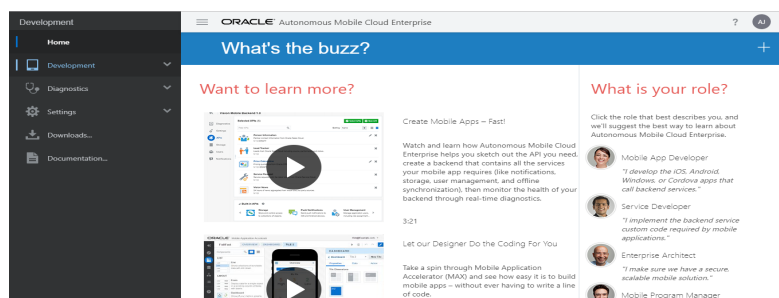
As Cloud services are rapidly growing in market, modern technologies like big data analytics, IoT, artificial intelligence and even web and mobile app hosting all need heavy computing power. Cloud computing offers enterprises an alternative to building their in-house infrastructure. With cloud computing, anybody using the internet can enjoy scalable computing power on a plug and play basis. Since this saves organizations from the need to invest and maintain costly infrastructure, it has become a very popular solution. There are many companies that offer cloud platforms for development, management, and deployment of applications. From our survey we have observed that different enterprises used cloud based applications using several cloud platforms popularly Amazon web Services, Google Cloud Platform and Microsoft Azure. Due to powerful and flexible solutions provided these services they are been widely used [7].

V. REAL TIME USAGE OF CLOUD SERVICE IN ENTERPRISE

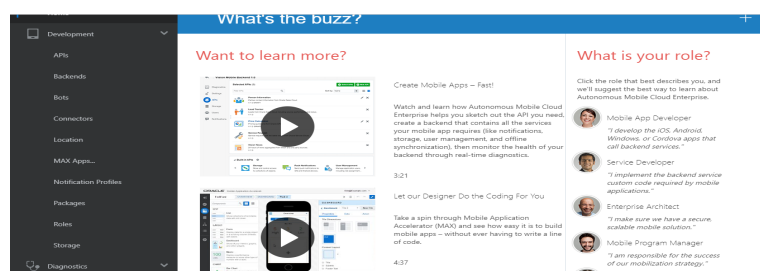
Oracle's Mobile Cloud Service (MCS)

Oracle offers a total of 40+ cloud solutions, this is one of them. The purpose of this cloud is to facilitate the Mobile applications. This cloud acts as interfacing layer for mobile applications and provides features like notifications, offline synchronizations, mobile device management, device synchronization, GPS and many more.

This screen is home screen for MCS



Here, you can see the Menu that MCS offers.





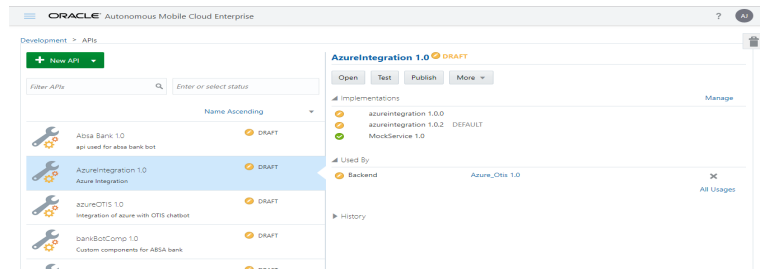
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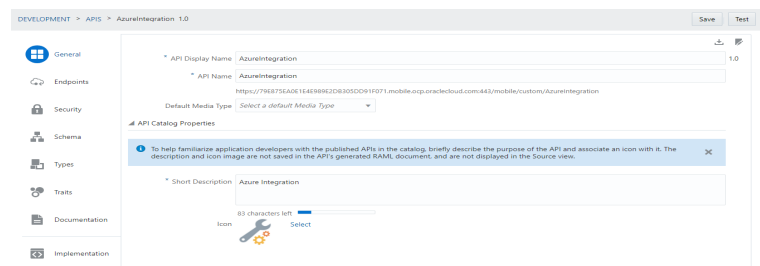
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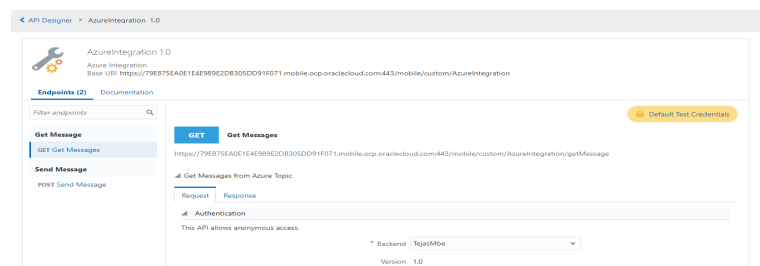
This screen shows the interfaces to backed knowledge base.



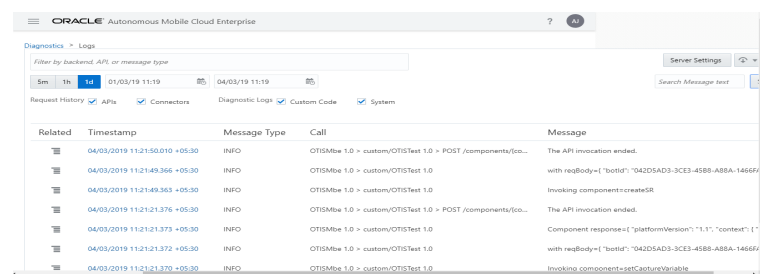
General configuration of interfaces



This is on-board test engine.



These are the logging capabilities of MCS.



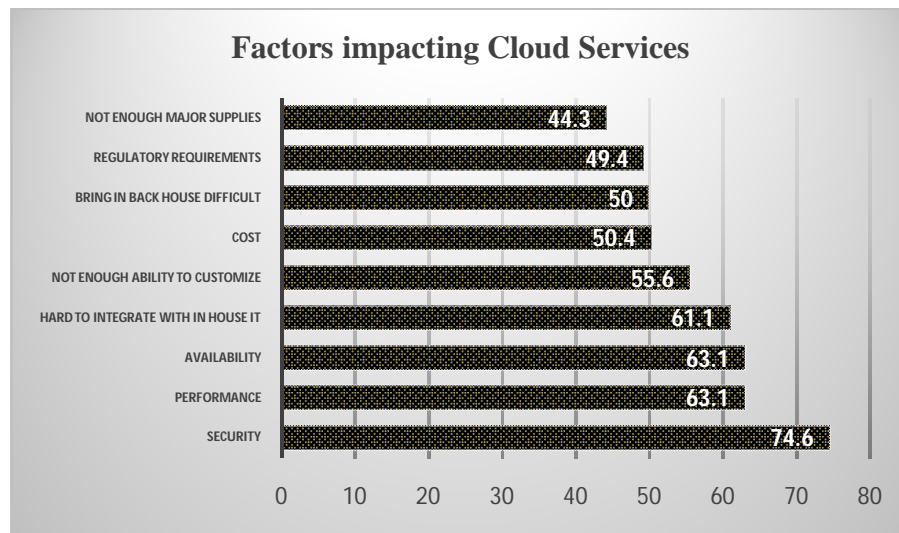
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VI. ANALYSIS



From the survey we can observe that the above mentioned are the reasons due to which the enterprises are using the cloud platform for various applications. They are:

- **Security:** One of the key factors related to cloud computing is a security and data protection. For businesses deploying all their information to remote locations, which are shared with other users, is a risk. Despite the fears and contrary to the expectations, data in clouds are often better protected than if they are stored on local companies' servers and maintained by internal IT departments[5].
- **Performance:** As cloud computing pops up in more and more IT departments, some cloud services have seen their performance woes exposed. Response times have been known to fluctuate, and certain cloud services respond differently to varying stress levels. For example, Google App Engine is designed as simple development platform that suffers when subjected to lengthy requests, while Amazon Web Services (AWS) values cheap, elastic computing power above all else. Cloud services continue to evolve beyond these limitations, however, and some cloud users have already come up with a solution -- launch one too many instances and shut down the stragglers
- **Availability:** Percentage of time that service or system is available. Cloud Computing offers high efficient data retrieval and availability.
- **Integration:** Core issues arise while tossing data out to the clouds as syncing of data becomes mandatory to the traditional existing systems.
- **Customization:** It refers to change in the software code. It is not recommended unless in extreme circumstances because the cloud services provide flexibility and security to multiple clients which access the same software code.
- **Cost:** Though the startup cost is high revenue invested in the setup is recovered over a period of years. Virtualization has many advantages in deploying the application, so it is preferred over traditional methods even though the cost is high.
- **Backhouse Difficulty:** There is no particular trend to move away from cloud computing and towards insourcing, but due to some factors like downtime, slow latency, some organizations may change to traditional methods but there are new inhouse expert employees who control the overall matter.
- **Regulatory Requirements:** Cloud Businesses have to be compliant to a regulatory regime whether the state, federal or internal. The nominal additional investment in security potentially can prevent a bad situation from rising in future.
- **Quality:** In a cloud-based system, all documents are stored in one place and in a single format. With everyone accessing the same information, you can maintain consistency in data, avoid human error, and have a clear record



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of any revisions or updates. Conversely, managing information in silos can lead to employees accidentally saving different versions of documents, which leads to confusion and diluted data.

VII. CONCLUSION

Our study reveals that the move from on-premise software to cloud services synthesizes the specificities of enterprise software vendors' business model. We can observe here how cloud is beneficial over the traditional methods to deal with data using certain methods like SAP, Salesforce etc. Applications deployed on cloud eliminates the typical challenges presented by localized power grid interruptions, physical data loss due to catastrophic events and malicious onsite attacks to the IT infrastructure within an enterprise. The cloud computing framework provides an optimal environment for faster, safer and cheaper delivery of IT services within an organization.

VIII. ACKNOWLEDGEMENT

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BIOGRAPHY

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