Case Studies of Security in Cloud Computing

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Abstract— *Today IT is faced with the challenge of trying to respond to rapidly changing business environments on limited budgets, needing to support legacy applications as well as new modern software applications. Cloud computing offers substantial benefits in terms of agility and cost-effectiveness but cloud platforms are not commodities, with one easily substituted for another. Today, most companies want and need to have both onsite and offsite IT environments. Most cloud offerings, though, are only designed to run new applications, not support older legacy ones. This paper briefly outlines different aspects which are helpful for fast computing and major factors that dominate the future computing world and also describes about innovation cycle in IT Sector.*

Keywords—*innovation cycle; cloud; services; servicification; Dos*

I. INNOVATION IN SOFTWARE AND IT

The software and services sector is depending on several drivers and related processes for innovation which in many areas results are not up to the mark. This made the IT industry to migrate to concepts of cloud. The main motivation for migration to cloud is PAAS (pay as peruse) feature and unlimited storage.

II. INNOVATION TRIGGERS

The following are innovation triggers for the software and services sector.

A. Technology availability: Technology roadmaps in the hardware and network sectors are highly predictable. A continuous challenge for the software sector is to assess these Road maps, explore potential usage areas and eventually develop new innovative products exploiting the advances brought by the technology sector. The innovation clock speedhowever, is largely determined by the underlying technology[1].

B. Socio-economic trends: Further innovation in the software and service sector is driven by emerging socio - economic trends. Social networking, for example, had severe impact on data management and processing. New mechanisms for distributed storing and processing of data had to be developed rather quickly building upon fundamental research results in academia earlier which were advanced by industry and brought into a new industrial application environment.

B. Platform-based innovation: A further dimension is innovation on top of platforms. Examples of such platforms are the Windows operating system, Facebook and the Apple iOS platform in conjunction with the App Store and the Android ecosystem. In all these cases the availability of these platforms has significantly lowered the barrier for other players, often SMEs, to innovate quickly, to access a market , and to monetize easily. Generally, innovating a platform tends to have longer cycles than the innovation on top of these platforms, yet the innovation speeds of both are usually faster than in the technology- driven space

*D. Servicification***:** The availability of software - based services, accessible over the Internet by means of simple-to-use Application Programming Interfaces (APIs),allow for third parties to quickly innovate new solutions on top of such services. A simple example is the speed of innovation on top of available Cloud - based storage services such as Drop box and Box.net which both have grown an amazing ecosystem of applications around their basic services and managed to boost innovation through third-parties[1].

E. Continuous Operations Innovation: specifically addresses how an innovation can be operated at low costs in a way to keep sufficient margin in the overall business model. With the Cloud, the deployment and operation of software has moved to the centre of considerations impacting even the product and service design and architecture. The overall costs in this phase are usually called Total Cost of Operation (TCO). Especially in areas where the TCO is critical to the overall business model, this area will be subject to continuous innovation of the management and operations of software systems

These innovation triggers constitute the initial part of an entire innovation cycle. The triggers kick-start loops of continuous innovation and improvement in the Software and Service sector as illustrated in the following figure

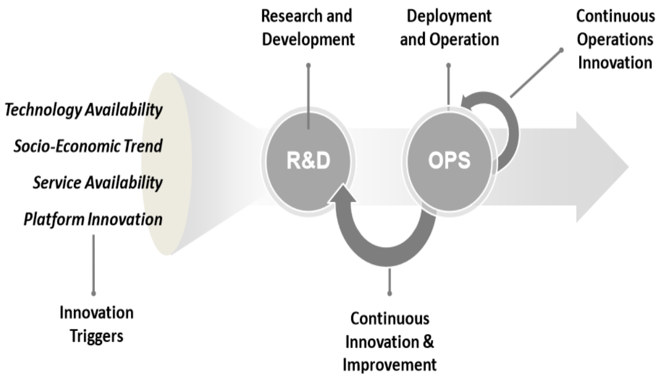

FIG 1: INNOVATION LIFE CYCLE IN IT SECTOR

III. CLOUD

CLOUD computing is 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. This CLOUD model is composed of five essential characteristics, three service models (Software / Platform / Infrastructure as a Service), and four deployment models, whereas the five characteristics are: on- demand self-service, broad network access, resource pooling , rapid elasticity, and measured service. The deployment models include private, community, public and hybrid CLOUD.

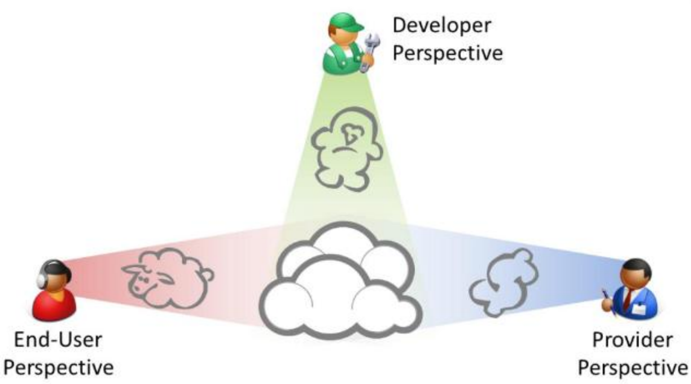

FIG2: SCHEMATIC THREE DIFFERENT PERSPECTIVES IN CLOUD

A.The(non-technical)user perspective

B.The provider perspective

C.The developer perspective

IV. RESEARCH ISSUES AND REQUIREMENTS

A. Economic models & expertise: The market structure of CLOUDs is as yet generally unclear– when and how CLOUDs are profitable is still mostly subject to guesswork and experimentation. Most existing data is constrained to specific use cases and platforms. New cost and pricing models are needed and more knowledge needs to be gathered as to when it is sensible to move to CLOUDs, and how much cost and effort this implies[2].

B. Scale & heterogeneity of modern IT environments: The scope of user devices, as well as infrastructure resources has grown beyond easy manageability both in terms of size / scale, and diversity / heterogeneity. Optimizing the resource utilization becomes increasing complex and is hardly supported by either code or data hosted. Automation is thereby crucial.

C. Communication limitations: The increased scale leads to increased communication and data traffic that exceeds the physical connection and processing limitations, and also the current network management methodologies[2].

D. Modalities of scale: Code and data are not prepared for exploiting the CLOUD environment and all its characteristics. Algorithms exhibit thereby both modalities of scale horizontal and vertical, and the environment has to deal with the according impact on execution[2].

E. Migrating applications: The full impact and consequences of moving applications to the CLOUDs is as yet not clear. As long as the switching cost is high (lack of programming model, lacking interoperability etc.), the benefits and the scope of impact must be clear for the use cases that actually benefit from CLOUDs.

F. Security : Security is the first and foremost thing which was effecting its growth to some extent. Since data of user or organization is stored in some remote server there is every possible chance for alteration and manipulation.

V. RESEARCH ISSUES ON SECURITY

A. Data breach: A virtual machine could use side-channel timing information to extract private cryptographic keys in use by other VMs on the same server. If a multitenant cloud service database isn't designed properly, a single flaw in one client's application could allow an attacker to get at not just that client's data, but every other clients' data as well[3].

B. Data loss: A malicious hacker might delete a target's data out of spite -- but then, you could lose your data to a careless cloud service provider or a disaster, such as a fire, flood, or earthquake. Compounding the challenge, encrypting your data to ward off theft can backfire if you lose your encryption key.

C. Account or service traffic hijacking: The third-greatest cloud computing security risk is account or service traffic hijacking. If an attacker gains access to your credentials, he or she can eavesdrop on your activities and transactions, manipulate data, return falsified information, and redirect your clients to illegitimate sites.

D. Insecure interfaces and APIs: IT admins rely on interfaces for cloud provisioning, management, orchestration, and monitoring. APIs are integral to security and availability of general cloud services. From there, organizations and third parties are known to build on these interfaces, injecting add-on services[3].

E. Denial of service ranks: DoS has been an Internet threat for years, but it becomes more problematic in the age of cloud computing when organizations are dependent on the 24/7 availability of one or more services. DoS outages can cost service providers customers *and* prove pricey to customers who are billed based on compute cycles and disk space consumed. While an attacker may not succeed in knocking out a service entirely, he or she "may still cause it to consume so much processing time that it becomes too expensive for you to run and you'll be forced to take it down yourself[3].

F. Malicious insiders: A current or former employee, a contractor, or a business partner who gains access to a network, system, or data for malicious purposes. In an improperly designed cloud scenario, a malicious insider can wreak even greater havoc. From IaaS to PaaS to SaaS, the malicious insider has increasing levels of access to more critical systems and eventually to data.

VI. FUTURE ROLE OF SOFTWARE, SERVICES AND CLOUD

Software, services and Cloud technologies will have a significant impact on the future evolution – not only of the
Software and service sector but for all kinds of industries and sectors. In particular, we anticipate the further up take of Software and Service Clouds , which means that Clouds will be focused on the delivery of application and process - level, software – based , services and solutions.

The future role of software and Cloud technologies is characterized by four main elements.

A. Cloud will become the major driver for innovation and productivity gains in the software and service industry, as it naturally supports all kinds of innovation aspects: Cloud can directly support almost all innovation aspects ,in particular the innovation triggers but also the operation and improvement. As an example, newly available technology, integrated into an infrastructure Cloud can be directly exposed to a large community of adopters. Socio-economic trends can be most easily tested with selected user groups via the Internet. Platform-based innovation is supported as the Cloud easily allows for building platforms respectively. Servicification is directly supported by Cloud for all kinds of solutions. The Cloud operation model provides an ideal basis for constantly monitoring, analyzing and improving the operation of solutions. Last but not least, it offers the possibility to directly observe the usage of solutions and features, thus providing an ideal basis for continuous improvements[4].

B. The Software & Service Cloud is the dominating Cloud innovation field of the future: This simply follows from the general Cloud trend which demonstrates that costs are not any longer the main reason for adopting the cloud – however, speed and agility is. This goes hand in hand with the changing value drivers that are supported by Software & Service Cloud.

C. In the future software will be to a large extent Cloud-based
i.e. designed for and operated in a Cloud: While the past was characterized by discussions on how to move (traditional) software into the Cloud , we will see a new class of software directly designed for running in the Cloud and thus benefiting from underlying Cloud technologies much more. Overall , the majority of future software will reside either in the Cloud or on (mobile) devices[4].

VII. ESSENTIAL RESEARCH ISSUES

A. *Business and cost models:* CLOUDs open up a large scope of new business models, but also implicitly generate a lot of problems to make these models viable. Self -hosting and –provisioning becomes easily affordably this way but may not generate any revenue directly itself, unless other cost and payment models have been found. So far, services on the CLOUD are expected to be free or at least at low cost, and the cost for maintaining the underlying network is frequently completely neglected, so that the revenue stream for telecommunication industry is low. Also the growing competition between CLOUD (service) providers makes it more and more difficult for users to identify and compare the value of offerings[4].

B. Data management and handling: Though plenty of work has been invested into distributed data bases etc., the special concerns of CLOUDs with respect to dynamicity, distribution, concurrent access, locality etc. pose issues that have as such hardly been addressed. Data production and consumption is constantly growing, with the environment (both soft- and hardware) not being ready to handle this scope: applications do not encode the relationship between code and data properly, let alone that CLOUDs can exploit this relationship efficiently. Most data is still structured completely monolithically without respecting the environment and the need for communication, let alone for distribution and consistency. Data could and should move with the need put forward by the environment (i.e. location of user and compute unit).

C. Programmability: In order to cater for data management, resource awareness, performance and related issues, it is imminent that the program (and its relationship to data) is structured accordingly and exploits the specific features of the distributed, dynamic environment. Programming models are however still generally oriented towards single- core, local, sequential execution, following the principles laid out by Turing and von Neuman. Thus it is not only difficult to develop an efficient CLOUD application / service, because the according knowledge is missing, but more importantly because the programming model does not cater for it in the first instance and demands a high amount of expertise and effort to compensate for these deficiencies. New programming models must therefore address aspects of distribution, parallelization and replication from base up[6].

D. Network management: Network management for CLOUD computing and IT and Network altogether are important and currently not well covered areas. CLOUDs require the seamless provisioning and management of resources on all levels, in order to fulfill the base characteristics of CLOUDs, in particular regarding availability. As such, wrong network management can cause e.g. starvation of individual services, due to the problems of isolation and lacking management / control over the connectivity. Such management therefore needs to take the full scope of relationships between software, hardware and network into consideration, as they influence each other strongly, and cater for the increasing scale of usage and infrastructures. The main goal consists thereby in improving the service capabilities and quality– therefore it is not clear, whether future services should be able to control the network, or whether to continue the classical line of high quality over a best effort network. This will depend strongly on the type of service offered[6].

VIII. CONCLUSION

Research in the above issues that were described in this paper makes computing much easier and cheaper. Still cloud computing research is in starting stage, though lot of issues can be solved for easier use of cloud, security Breaches making the cloud much difficult to work on, usage of different algorithms for security simplifies the problem of security to some extent, but still there is lot of issues to work on.

IX. REFERENCES

[1] NESSI–Cloud White Paper A Software & Service Perspective on the Future of Cloud in Europe.

[2] Lutz Schubert, Keith Jeffery," Advances in Clouds Research in Future Cloud Computing."

[3] Ted samson," 9 top threats to cloud computing security"

[4] Brooks, C "How to build an application for the Cloud. Search Cloud Computing. Available online"

[5] G.Stuer, K.Vanmechelena, J.Broeckhovea,"Acommodity market, Future Generation Computer Systems "

[6] Cloud Security Alliance, "Top Threat to Cloud Computing V1.0," March 2010. [Online]. Available: https://cloudsecurityalliance.org/topthreats/csathreats.v1.0.pdf