Cloud Computing: A Vital Enabler In Times Of Disruption

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1. INTRODUCTION

Cloud computing has been a key enabler for organizations adapting to the digital world in recent years. Some industries (e.g. e-commerce, travel) were early adopters, with highly regulated sectors such as financial services and health starting this journey a little later. While the financial services industry's adoption of cloud is still in a relatively early stage, COVID-19 has suddenly and dramatically magnified the focus on resilience and the increased the need for agility and digital scablity. The disruption has visibly demonstrated the importance of cloud and its benefits.

The IIF previously produced a 3-part series looking at the key characteristics of cloud computing architecture, and the growing importance of these for financial services. In our first paper *Cloud Computing in the Financial Sector: an Essential Enabler*, we highlighted that the biggest risk associated with cloud computing was the risk of not moving to cloud.[1] As well as technical and security risks, we also highlighted the business risk: the risk of not being able to keep pace with customers' needs, and being left behind.

For those institutions that had already started their cloud journey as part of the broader digitalization process, this brings benefits in the ways that they can fulfill customers' expectations, but also very importantly, in supporting business continuity.[2] On the other hand, those organizations with less versatile infrastructure lack that same flexibility in dealing with the changing operational environment.

The situation derived from the COVID-19 pandemic, as in most aspects of life, has proven to be an accelerant of some trends that were already identified, of some activities that were already underway. It is also a differentiator for those that are and aren't advanced in their adoption of the key technologies.

Cloud computing is playing an increasing role in ensuring the smooth provision of services, and this has been demonstrated throughout the pandemic, also enabling the opportunity to provide additional new services in simple, cost-efficient fashion.

In financial services, firms have undertaken a transition to new models of work, and faced a sometimes unpredictable increase in workloads. Cloud has played an important role in managing this, from the day-to-day transitioning from physical to remote environments, to managing volatile spikes in service demands.

[1] https://www.iif.com/portals/0/Files/private/32370132_cloud_computing_in_the_financial_sector_20180803_0.pdf
[2] Cloud computing always understood as a journey that involves the whole organization and is embedded within the entire strategic approach and not as a one-shot decision / program

For some firms, cloud architecture has represented a key element to effectively manage the new scenario, supporting a resilient infrastructure in the context of the otherwise limited bandwidth of traditional architectures.[3] The elasticity and scalability characteristics of public cloud, in addition to the ability of cloud workloads to be available via the public internet on an "any time any place" basis and beyond other clear and demonstrated benefits, have made this a powerful tool for firms using public cloud in responding to such a global and disruptive environment. This acquires special relevance in the provision of financial services, in many cases considered "essential." In the US, EU and many other countries, governments are leaning on financial institutions (FIs) to deliver additional crucial services to citizens, like disbursement of stimulus funds. ePayments systems are dealing with unprecedented transaction volumes, as convenience and hygiene concerns drive an accelerated shift to cashlessness.

2. CLOUD COMPUTING AND RESILIENCE

COVID-19 has shown the limitations of legacy applications and infrastructure in their ability to support both the immediate shift to primarily digital engagement with consumers and the extraordinary volumes and volatility that are challenging global markets.

Key applications must provide continuous service, in the face of events such as this global health crisis, hardware failures and human errors. Outages create risks of application downtime and data loss, resulting in revenue loss, legal and financial implications, impacts to reputation (trust) and customer dissatisfaction. The added versatility of cloud delivers new ways to mitigate risk and build resilience against outages, supporting financial stability.

Among its many benefits, cloud computing architecture can help to ensure that financial institutions and the critical functions they perform are resilient to disruption (keep their level of availability) whatever the cause.[4] Cloud is an important component for continuity of operations and efficient failover in times of crisis and operational disruption, and is increasingly part of the architecture for overcoming these challenges and ensuring comprehensive execution.

Four of the central characteristics of public cloud make it uniquely valuable in increasing resilience are described below - **various IIF members have highlighted real examples of these key factors, which are described further in Section 3**.

(i) Cloud is distributed in nature

The major cloud providers have global infrastructure with distribution of data centers across zones and regions (with zones physically separated and isolated to effectively avoid contagion risk) to prevent single point of failure.

(ii) Redundancy: A major benefit of the cloud

Data or other operations can be replicated across regions without compromising the level of service enabling redundancy without impact on latency. In addition to that, dependencies and calling patterns between regions are asynchronous and ring-fenced with safety mechanisms, allowing redundancy configurations at a scale and economy that were not previously possible.

[3] https://www.gartner.com/smarterwithgartner/achieve-infrastructure-resilience-during-the-coronavirus-outbreak/
[4] The broader range of cloud computing's benefits are described in our IIF paper

(iii) Cloud is elastic and scalable in nature

Elasticity is the key feature of cloud architecture that allows firms to adapt to market conditions very rapidly and efficiently. In a COVID-19 situation, the most relevant benefit of this is the ability to scale up automatically without physical on-site presence, adding servers to process peaks to minimize service disruption or outage.[5]

For example, Google Cloud's Burst Capacity Solution[6] provides additional compute and analytics capabilities that can handle some of the most compute-intensive workloads. This sort of solution can help financial institutions quickly glean more from data, virtualize productivity tools and scale up and out hundreds of cores and terabytes of memory. The end goal is to ensure FIs infrastructure can handle significant traffic spikes and support the most demanding workloads, securely, efficiently and at scale.

Scalability has been critical in many different ways, but we can focus on the aspects that have benefitted more from this characteristic of cloud architecture. These aspects, as mentioned at the beginning of this section, can be divided into two:

a) Where cloud computing has made the process simpler and faster. Cloud computing has positively impacted employees and customers alike.

   - Impact on employees

     As staff couldn't reach office during lockdown, providing remote work capabilities and workstations for employees was a must for many FIs that had the need to dramatically increase the number of people with teleworking capacities in reduced timeframes in a secure and seamless fashion.

   - Seamless impact on customer service

     Extending secure and reliable access to applications and systems remotely, creating virtual desktops for branch staff or call center agents has been translated into the possibility to provide high-standard customer service without incurring significant capital investments.

b) Where cloud computing has been more than a facilitator, it has become a vital enabler to avoid service disruption. Cloud computing has impacted the actual provision of service in an environment of massive market volatility.

(iv) Cloud relies on the public internet for delivery, rather than Virtual Private Networks (VPNs), which are hardware dependent and can throttle traffic if not scaled properly. Because of protections like encryption and sharding, data traveling via the internet can be kept safe in the same way as via VPN, and this has been a big part of Cloud's success in the response to COVID-19.

[5] It is acknowledged that in extreme situations (like COVID-19, with disruption across jurisdictions and across industries), even big cloud services providers may have experienced some capacity issues. However this still represents a superior scenario than relying only in less elastic / scalable architectures.

[6] http://services.google.com/fh/files/misc/burst_capacity_solution.pdf

3. CASES STUDIES THROUGH THE COVID-19 CRISIS

Acknowledging that the massive COVID-19 challenge is very difficult to manage in any case, those organizations that had already started the cloud journey (entailing technology, talent and cultural shifts) have been able to face these disruptive times with distinctive tools and capacities.

That said, it's also true that most organizations have confronted similar challenges, which we have tried to classify. Through our conversations with IIF members we have identified:

(i) a series of common situations where most organizations have had to adapt to a new reality, and responses have been broadly similar across the board, with cloud computing as a facilitator to make a smoother and more efficient transition; and
(ii) some specific situations where cloud's profound advantages were instrumental.

We can identify two main situations where the elasticity and scalability of the cloud architecture have been an important asset to evolve the traditional model and to make it in a fast and efficient fashion.

a) Remote working. One of the most transformational impacts of the COVID-19 pandemic on most organizations is related to a fundamental change in the day-to-day activity, where the new normal is characterized by transitioning to a remote workplace environment. This has a huge impact in the way employees conduct their daily activity from the cultural perspective (as they need to adapt a completely different relationship model), but also from the technology perspective as this new situation needs a much bigger bandwidth allowing the capacity to undertake their activity in the new environment. The escalation from 20,000 remote workers in mid-February to 180,000 in mid-March, as mentioned by HSBC, is a clear example of the magnitude of the situation; another bank reported an increase of remote workers from 13,000 to 40,000 are. This challenge has been taken as a positive impact of the pandemic as technology has demonstrated to be elastic and resilient enough and employees are adapting rapidly to the new environment.

   In addition to this, the access to collaboration tools such as Microsoft Teams, Zoom, Google Meet, BlueJeans and Webex is a key part of the new normal, in the daily routine for employees to be in close contact with colleagues and also customers. Many firms had already deployed these collaboration tools and the adoption, very low at the beginning of the pandemic, has been massively expanded. A big part of the success of these cloud-based tools during COVID-19 was that cloud relies on the public internet for delivery, rather than on traffic-constrained VPNs. In this sense, cloud-based collaboration tools help to take the strain off of firms' VPNs, therefore helping to enable the firms to scale up their work from home capabilities, while utilizing encryption and sharding protections.

   A major North American bank executive mentioned that their institution had deployed Microsoft Teams prior to the COVID-19 challenge, but only to about 500 users. In the first several weeks of working from home, the bank rapidly expanded to over 9,000 Teams users and is now continuing deployment to over 50,000 employees. The executive added that Teams made a tremendous positive difference in collaboration capabilities among bank colleagues. In the same vein, throughout this period Banco Santander has increased x4 the volumes of daily chats and x30 the daily video/calls connections to respond to

employees' needs. Similarly, Google reported that in March, the company saw daily usage of its Meet video conference application grow by 30x, with 3 billion minutes of video meetings hosted daily. In April, Google reportedly was adding roughly 3 million new users every day.

In many organizations' post-COVID-19 plans for the "return to office" scenario, these tools that allow workers to reduce physical proximity will remain in place and are part of the protocols in many hybrid (remote/physical) models.

b) Remote servicing. Another angle to look at the new environment in which teams within organizations are working is on how they are providing services to customers. In an industry immersed in a fast digitalization process, is also fair to recognize that the traditional contact with customers takes place mainly through physical channels and even today around 40% of active customers still use manned channels, meaning branch or call center.[7] So the COVID-19 pandemic has represented a real challenge from the servicing perspective, to be able avoid any disruption. In this regard, many organizations have been able to rely on cloud-enabled virtual desktop infrastructure (VDI) to ensure that branch staff and call center agents were able to maintain the level of service with customers, being able to deploy most of their daily activities in a remote environment. For firms such as Santander, this has been of great help to keep up with service levels. In the same line, Scotiabank states that moving forward it's important to be prepared to react quickly to a similar situation. In this sense, they have accelerated their investment plans around VDI. It's also interesting to consider that the deployment of VDI can definitely be enhanced by the possibility of leveraging on the use of solutions like e-signature, or others that offer a full suite of services to customers, even remotely. The ability to deploy such solutions can vary depending on the different regulations across jurisdictions.

For the second group of situations where cloud computing architecture has been vital to overcome disruption, some more heterogenous situations are highlighted with these case examples from IIF members:

Scotiabank, like all capital market participants, faced a huge spike in trading volumes and volatility in the immediate wake of COVID-19. The use of Microsoft Azure helped them to quickly and seamlessly scale to cope with unprecedented market dynamics and to manage risk effectively. This is a clear example of how cloud computing architecture offers an upgrade from traditional operational resilience paradigms, where there would likely not have been enough time to properly react and build capacity to meet business requirements.

Another bank experienced a similar situation during this pandemic, in the context of liquidity management. The significantly increased processing power of their Google Cloud solution allowed them to calculate their liquidity position multiple times a day even under adverse conditions, a capability that would not have been possible using on-premise compute capacity. This made a great difference in dealing with an extremely volatile market, allowing them to continue to meet their regulatory requirements without raising the risk of an outage or detracting from other services that also required compute capacity.

[7] https://www.mckinsey.com/industries/financial-services/our-insights/the-balancing-act-omnichannel-excellence-in-retail-banking

Finally, a European bank with strong presence in different jurisdictions was able to provide service to their operation in Brazil from the US. They experienced some extra latency, but it was a way to keep on providing service to a key region for the bank. This was enabled by a trade agreement between Brazil and the US, and the absence of any data localization regulations, so that the distributed nature of cloud could be utilized.

4. CHALLENGES AND BARRIERS TO CLOUD ADOPTION

The COVID-19 pandemic has represented a global challenge for every organization across all industries. It has had a tremendous impact in trends that were already underway. Digitalization is the most obvious of the areas that firms are now looking at with fresh eyes. In the coming months, firms will likely reevaluate existing plans and timelines as they consider whether further (and accelerated) adoption of cloud is something they can put off any longer. Indeed, one of the clearest COVID-19 trends has been the acceleration of digitalization plans that are critically underpinned by cloud computing as a fundamental building block.

Precisely because of the greater prominence of cloud in the pandemic response, some of the regulatory barriers to adoption have become more visible even when, in most cases, they were already on the radar.

While many regulators have increasingly recognized cloud computing as an opportunity (beyond the risks that have to be managed), and that they are now (because of the pandemic effects) more open and willing to deep dive on the benefits of this key enabler, there are still a number of barriers that make cloud adoption difficult, especially in highly regulated industries.

Even within the financial sector, regulatory fragmentation across jurisdictions impacts cloud adoption within the organization due to the large number of rules. In this sense, data localization restrictions and cross border inconsistencies (different interpretation and application of guidelines and supervisory requirements) continue to act as key barriers to optimal cloud adoption. This is especially so for multinational organizations, seeking to generate a holistic view of their global business and risk profile, and potentially leveraging different regions' service from cloud service providers (as highlighted above with the US-Brazil example) to enable greater operational resilience.

In addition to the aforementioned main barriers, there are others to consider as they also represent a challenge to unleashing the full potential of cloud computing.

'Traditional' outsourcing rules address the risks arising from a dependency on a third party for provision of essential services. The underlying concern is that a firm may be unable to complete essential tasks or provide essential services should that third party fail. Such outsourcing rules place restraints and safeguard on the use of cloud service providers. The benefits of redundancy, scalability and elasticity as highlighted in this paper mitigate continuity risk, but this is not completely understood by all stakeholders.

Another such barrier is the interdependencies between cloud and legacy systems. As outlined in our previous IIF papers, the migration to cloud computing is a journey, not a one-shot decision or execution. In this journey, many organizations prioritize the new applications to be deployed in the cloud, while legacy applications remain in legacy systems. This is something commonly accepted as part of the journey, as this is a complex issue and plans are defined to cope with this,

but it's important to remark that this interdependency may create issues during the process and may represent a big barrier if not managed properly.

Acknowledging the expertise and massive capacity of investment of cloud services providers in security, we also recognize that they continue to be a significant target for cyber criminals, and cybersecurity remains a significant risk and continues to generate scrutiny from regulators and supervisors. This is an important issue where financial institutions, cloud services providers and the official sector (including law enforcement) need to continue working vigilantly and collaboratively.

Acquisition and retention of talent also represent a relevant burden for cloud adoption. A good cloud computing migration represent a source of new capacities and security for any organization vis-à-vis a traditional architecture. However, if not done properly, it may turn into a big source of vulnerabilities. Having the right people in the organization commanding this process is of paramount importance and accessing the actual scarce market of software engineers may represent a huge barrier for certain organizations.

5. CONCLUSIONS

Cloud's value in enabling remote data access and storage has become even more demonstrable in light of the COVID-19 situation, enabling business continuity and mitigating risk.

Indeed, the experience of the COVID-19 pandemic so far has highlighted that:

(i) organizations with strong digital capabilities are better equipped to cope with this new situation;
(ii) existing digitalization trends are accelerated; many have emphasized the speed and depth of this recent transformation, including MAS Managing Director Ravi Menon, who observed "There has been more digitalization in the last two months than people had expected to see over the next five years;"[8] and
(iii) disruptions are inevitably going to happen, and you need to be prepared for those events.

In this context, the intrinsic characteristics associated with cloud computing architecture (the fact of being distributed, redundant and scalable in nature and the fact of being reliant on the public internet for delivery, rather than hardware dependant VPNs) have emerged as key enablers to help organizations to develop their day-to-day activities in a completely different environment, but also to deal with situations that have represented actual risks to the provision of (in many cases) essential services.

Where regulators and supervisors were already increasingly recognizing the benefits of cloud, the COVID-19 experience has also highlighted cloud's value as a crucial risk mitigant. Cloud has not just offered a way to maintain service continuity, but has also proven to be an enhancement tool for working away from the physical office (e.g. collaboration tools) combined with other technology for customer service and changes in regulatory requirements (e.g. wet ink signature replacement for signing contracts using cloud services). Several organisations are reviewing their long-term 'future of work' strategy, for which increased cloud adoption may be the key enabler.

[8] Ravi Menon, speech at ACI Live Aid: Financial Markets Give Back, 29 May 2020, https://www.bis.org/review/r200604b.htm

In addition to that, COVID-19 has shown how demonstrably important data connectivity is in the managing of global challenges, and therefore cloud's value in enabling remote data access and store has become even more demonstrable. This and the ability to port between sites in enabling business continuity may pose robust implications for the policy debate around cross-border data connectivity/localization. As cloud computing has become an essential part of the technology stack across the economy, it merits greater coordination across sectors and across jurisdictions.

Finally, to reiterate from our aforementioned IIF 3-part series, we conclude that the biggest risk of cloud computing is the risk of not moving to cloud. The current situation has highlighted and accentuated this statement. Not only for the possibility of being left behind, but also (and now most importantly) for not being able to deal with a new reality that is going to be digital and, in many cases, volatile and unpredictable.

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