FROM TRADITIONAL IT TO CLOUD COMPUTING: A CEDRE OPPORTUNITY FOR IT SERVICE PROVIDERS IN LEBANON

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ABSTRACT

Cloud Computing technology shall impact traditional IT and IT service Providers on many levels; for Oracle (2019), 80 % of all enterprises workloads will come to the cloud by 2025. Using qualitative interpretive multiple case study approach, this article discusses cloud computing value co-creation opportunity for IT service providers in Lebanon harnessing CEDRE conference funds to install a National Cloud Platform of 200 million $.

KEYWORDS: Cloud Computing, Traditional IT, Service Provider, Innovation Theory, Value Co-Creation, Lebanon.

INTRODUCTION

The traditional perspective to exchange goods and services for money is increasingly being challenged with the emerging of Cloud Computing (CC), one of the most significant shifts in modern Information Technology (IT) (Hashem et al., 2015). In traditional computing, each business would buy their own server equipment, incurring high infrastructure investments only payable by large corporations. Today, this traditional perspective to IT investments is increasingly being challenged as CC is becoming a critical component of IT as next-generation business (such as Blockchain, the Internet of Things and Artificial Intelligence) storm into reality (Gartner, 2019).

However, moving IT services to the cloud reshapes a company's IT landscape and can heavily impact its operations (Loebbecke et al., 2012). Actually, companies are under pressure to reinvent their business models as their borders are dissolving and the value creation process is changing from linear to networked, from top-down to bottom-up, from centralized to decentralized, and from closed to open (Kohler, 2015). In fact, customers are no longer regarded as passive targets of

marketing actions, they are rather co-creators or co-producers than an objective audience (Lusch et al. 2007), changing their role "from isolated to connected, from unaware to informed, from passive to active" (Prahalad and Ramaswamy, 2004a, p. 4). Furthermore, IT service providers who, in the past, had a local commercial added value, are now adapting their business model to the cloud era. Indeed, traditional in-house IT services model has been disrupted with the increased adoption of CC (Gutierrez, et al. 2015). CC client companies can select their services on the cloud directly from vendors or from the cloud infrastructure providers.

In this context, the Lebanese economy which lacks adequate infrastructure, has a golden opportunity to leverage the recent funding secured through the international infrastructure investment conference held in Paris in April 2018 (CEDRE) and the "Beirut Arab Economic and Social Summit" (BAESS) held in January 2019, in addition to the Lebanese ministry of telecommunications USD 200 million "National Cloud Platform" initiative.

This article aims to identify the process of value co-creation in the CC era. Using a qualitative interpretive multiple case-study approach based on qualitative data collected cross-sectionally using semi-structured interview guide coded abductivly, this article is designed to explore how moving IT services to the cloud can impose a logic of co-creation and collaboration, and how Lebanon can benefit from the CEDRE funds?

We shall start with the literature review detailing all the theories selected to guide the field study. Then we shall present our research methodology and context, in order to expose, analyse and interpret our research results while discussing the implications of our results for further research.

TRADITIONAL IT VS. CC TECHNOLOGY

For LeadingEdge (2018), traditional IT infrastructure is consisting of traditional data Centers with the need of hardware setup such as servers and desktops; it is the "On-Premise" infrastructure. This traditional model, where companies are obliged to buy and upgrade hardware and software, is considered as highly secure giving companies complete control and monitoring over their Data, storage and applications... In the CC Technology model, no hardware is needed, all servers, software and networks are hosted on the Cloud or "Off Premises" where security is a challenge for clients and cloud providers. The Data Storage space on the cloud is charged by cloud providers on companies on a "Pas-As-you-Go" or "Pay-per-Use" basis (OPEX Model).

The main differences between Traditional IT Infrastructure and Cloud Computing are presented in the table 1 below:

Points of comparison	Traditional IT Infrastructure	Cloud Computing
Elasticity & Resilience	**Dependency on Hardware,** Limited capacity and susceptible downtime & Data Loss	**Unlimited Storage Space** & More server resources, Growth Opportunity
Flexibility & Scalability	**Limited resources,** Storage Space increasing is depending/requiring purchase of Physical servers	Managed by Cloud Providers that handles everything from A to Z - **Time Saving**
Automation	Full management requires dedicated resources - **time Consuming**	The Opex model increases cost management while improving profits on the long term
Managing Costs	Business growth requires more resources leading to **cost increasing**	Off-Premise servers and data managed by Cloud providers ensure security - a **challenge** and a risk
Security	You are responsible of the protection of your data, you manage it	Stand-Alone And Standardized Databases
Outsourcing Services	Pre-Packaged IT Services and catered to meet needs	

Traditional IT service management (IT support/helpdesk, hardware/software malfunctioning, back-office functions) are becoming obsolete, as more organizations are turning into cloud providers. For IDG (2018), in the CC era, IT traditional roles shall witness a disruptive shift towards new roles and functions (Cloud Architect/engineer, Cloud systems administrator, Security architect/engineer, Cloud systems engineer and Cloud network engineer). In fact, Cloud is the new frontline of IT Services as well as Software and Applications supply, and it is overtaking the traditional in-house system extremely fast because it is a reliable, scalable and cost-effective IT solution. However, several Organizations that have their own traditional IT infrastructure still rely heavily on it for security and managerial reasons, which makes security a huge challenge when it comes to CC without forgetting the balance between CC challenges and risks (security, internet connection and infrastructure, control and management and cloud provider dependency) on one side and CC benefits (mobility, cost saving, business continuity and disaster recovery, sustainability, automatic software updates, quality control and increased collaboration) on the other.

Finally, CC is becoming evident to all Organizations regardless of the business size or type.

1. THEORETICAL BACKGROUND

The theoretical background of this paper is based on the theory of innovation and the co-creation theory of Prahalad & Ramaswamy (2004a). As more and more businesses use CC and its related innovations, important changes are occurring at the value creation level through CC. In fact, the conventional view on exchange is being superseded by new forms and shapes of interaction. In this view, technology contributes to the co-creation of value.

1.2. CC: A RADICAL GAME CHANGER

CC refers to both the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services. In fact, the appearance of infinite computing resources available on demand quickly enough to follow load surges, the elimination of an up-front commitment by cloud users, allowing companies to start small and increase hardware resources only when there is an increase in their needs and the ability to pay for use of computing resources on a short-term basis as needed and release them when they are no longer useful, are the three new aspects of CC (Armbrust, et al., 2010). As for the possible architectures that CC provides as services for users, Hashem et al. (2015), enumerate three:

1) **The Infrastructure as a Service (IaaS)** where infrastructure devices are virtualized and provided to users as a service to install their operating system and operate their software applications (Amazon AWS, Rackspace, VMware, Joyent, Savis, Google Cloud Storage…).

2) **The Platform as a Service (PaaS),** where the environment for distributing storage and management tools are virtualized and provided to users as a service (Google Apps Engine, Force.com, Microsoft Windows Azure, LongJump, Amazon Elastic Beanstalk, VMware…).

3) **The Software as a Service (SaaS),** where software programs and applications (CRM, email, virtual desktop, interactive, transaction and browsing facilities) are delivered to users as a service (Salesforce, Netsuite, Lotus, Zoho, YahooMail, Hotmail, Cisco WebEx Weboffice…).

There are currently four main types of CC: Public, Private, Community, and Hybrid (Gupta et al., 2013): 1) When the cloud is made available in a pay-as-you-go manner to the general public, it is called **Public Cloud** (Armbrust, et al. 2010). It can be accessed by any subscriber. 2) When an internal data centers of an organization is not made available to the general public, it is called P**rivate Cloud**. It may exist on premise or off premise and could be managed by the organization itself or by a third party (Zissis & Lekkas, 2012). 3) When two or more organizations with similar cloud requirements (shared interests, communal concerns, security requirements…) share, use and control the cloud, it is called **Community Cloud** (Mell and Grance, 2011; Zissis & Lekkas, 2012). 4) Finally, the **Hybrid Cloud** is a combination of public, private and community clouds (Mell and Grance, 2011).

In a quickly changing world, innovation remains key to competitive advantage; in fact, the power of the CC model gives access to anyone, anytime, anywhere allowing them to acquire better experience on the exciting offerings and to participate in the selection process of goods and services and even building them up; it is disrupting how companies can create values to customers and how they can compete. The concept of disruptive innovation (Abernathy and Clark, 1985) was elaborated by Christensen (1997) and widened to include not only technologies, products and markets but also business models (Christensen, 2006; Markides, 2006). For Assink (2006), disruptive innovation is "a successfully exploited radical new product, process, or concept that significantly transforms the demand and needs of an existing market or industry, disrupts its former key players and creates whole new business practices or markets with significant societal impact". Companies adopting disruptive innovations can become "radical game changer" when they offer great opportunities for new profit growth in proposing a new business model.

Therefore, we can resume the existing literature in a four-quadrant matrix that suggests that innovation lies on two spectrums as illustrated in figure 1 below.
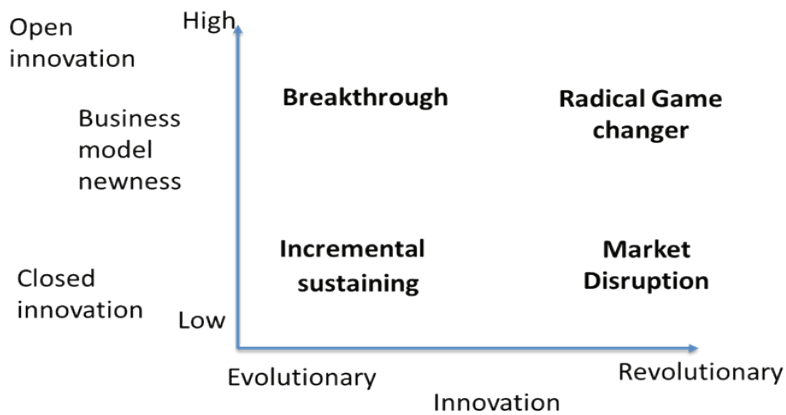

Figure 1: The four-quadrant matrix of innovations in organizations

Indeed, innovations lie on a first spectrum with evolutionary innovations on one side of the spectrum and revolutionary innovations on the other. Innovations on the organizational level lie on a second spectrum with closed innovations with low newness in the business models on one side of the spectrum and open innovations with high innovation in the business model on the other.

One of the key findings of Christensen's work is that disruptive technological innovations eventually grow to dominate the market. For Markides (2006), the only way to respond to the disruption is to 'accept it and then find ways to exploit it; and that's exactly what the Lebanese government and IT sector should do.

CC is clearly a radical game changer that offers great opportunities for new business models to all stakeholders. For Chiaroni et al., (2016), when disruptive innovations enter established markets, many companies fail to stay at the top of their industries. The huge radical transformation lead by large vendors among others SAP, Microsoft, Amazon… induce the urgent importance for IT organizations in Lebanon for aligning with the change enforced in order to survive and comply with the new era.

1.3. A NEW BUSINESS MODEL ADAPTED TO THE CLOUD ERA BASED ON VALUE CO-CREATION

Making unlimited resources available through CC with tremendous capabilities of connecting through various components (from sensors and smart device to data centers and analytics power), pressurize towards new directions and non-traditional models like Uber, Airbnb, Amazon, etc. leading to a new digital business shift. Hence, the booming in digital platforms, the business-driven frameworks that allow a community of partners, providers and customers to share and enhance digital processes and capabilities, or to extend them for business benefit. Such framework allows for combinations of leadership, talent, delivery and IT infrastructure platforms that power digital business models.

CC business models' success depends on whether they can create a win-win situation for customers, developers and themselves. In fact, the future of IT organizations lies in acting as a type of a service broker as part of a broader strategy, which Gartner (2019) calls "hybrid IT", forming Cloud Centers of Excellence (CCoE) where IT has the ability to consume services, as well as provide cloud services by leveraging cloud-enabled technology.

In this context, CC enables IT service providers to tap into the benefits of value co-creation (Sarker et al., 2012) while harnessing foreign expertise. In fact, co-creation allows companies and customers to create value through interaction (Prahalad and Ramaswamy, 2004a, b; Vargo and Lusch, 2004). From the co-creation perspective, suppliers and customers are no longer on opposite sides, but interact with each other for the development of new business opportunities (Galvagno, 2014). In fact, value co-creation is an interactive procedure, including at least two willing resource integrating actors, which are engaged in particular form(s) of commonly beneficial collaboration, resulting in value creation for those actors (Frow et al., 2011).

Prahalad and Ramaswamy (2004) initiated the co-creation of value movement as a new philosophy of business in their ground-breaking book "The Future of Competition". Their core idea was that companies could produce goods, services and experiences of unique value by involving customers and other stakeholders in a process of continuous innovation and learning, now a well-accepted practice (Gouillart, 2014).

Value co-creation mechanisms play a central role in the recent evolution occurring between companies and their customers. Often facilitated by technological advancements and the internet, it is through these mechanisms that the traditional roles of companies and customers are readjusted for the purpose of enhanced value creation for the actors involved in the resource integration process (Saarijärvi, 2013).

2. RESEARCH METHODOLOGY

Our research explores the managerial and organizational issues related with disruptive innovations in information and communications technology and more specifically, the changes that CC imposes on traditional IT and their impact on IT service providers in Lebanon. Hence, the research follows a qualitative interpretive multiple case-study approach to focus on the complexity of human sense making as the new CC situation emerges and at producing an understanding of the context of the IS in the CC era whereby it influences the business model of IT providers in Lebanon.

There is a developing convention to utilize qualitative research approaches to study Information Technology (IS) phenomena (Trauth and Jessup 2000); case study research figures among those qualitative methods (Klein and Myers 1999). Furthermore, interpretive studies attempt to comprehend phenomena through the meanings that individuals assign to them and interpretive strategies in IS are "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham 1993, p. 4-5). With this regards, we applied Klein and Myers (1999, p. 72) seven principles to conduct our field research: "1) The principle of hermeneutic circle; 2) The principle of contextualization; 3) The principle of interaction between the researchers and the subjects; 4) The principle of abstraction and generalization; 5) The principle of dialogical reasoning; 6) The principle of multiple interpretations; and 7) The principle of suspicion".

We are investigating the effect of CC implementation on IT organizations in Lebanon. Our exploratory qualitative study was conducted between January 2018 and January 2019.

Results are based on the analysis of evidence collected from ten semi-structured in-depth interviews targeting vendors, cloud services providers, IT service providers and other actors of the value co-creation in Lebanon. They are CEOs, General Managers and/or owners who hold their company's strategy and the market trends in Lebanon and the region. We maintain the anonymity of our informants by identifying them only with an alphabetic character and number (e.g., E1, E2, etc.). The interviews recorded and transcribed were analyzed in an abductive way (Dubois and Gadde, 2002) using the software Dedoose.

2.1. The Context of the article

Facts about cloud adoption worldwide show the urgency towards transforming on time within this environment impacting the whole business cycle for IT service providers. In fact, the forecasted trend worldwide and in the MENA region, in term of both revenue and multifaceted Cloud services, brings more evidence on the transformation occurring. For Gartner (2019) Worldwide Public Cloud Services Market and Revenue is projected to grow by 17.3 Percent in 2019 (the same figure stands in the Mena region) to total $206.2 billion. According to IDC (2018), 60% of all IT infrastructure spending will be Cloud-based and Nine out of ten companies will have some part of their applications or infrastructure in the cloud by 2019 (IDG, 2018).

2.2. The Lebanese Economic Context

The Lebanese economic situation is currently witnessing many imbalances due to diversified reasons (Chedrawi, 2019). In fact, the political and security instability in some countries of the region have negatively affected trade, foreign direct investment, Gulf tourism and financial transfers from the diaspora. In addition to the burden of the existing 1.5 million Syrian refugees. With this regard, several infrastructure sectors require substantial investments to enhance their economic contribution, in particular the high potential ICT/telecom sector which needs a lot of attention in order to develop and increase its prospective income and contribution which stands today at USD 1.3 billion or 11.2% of total revenues. Furthermore, the Lebanese debt-to-GDP ratio has maintained its deteriorated state, negatively affecting public investment expenditure (Chedrawy and Howayek, 2014).

With this regards, the international infrastructure investment conference held in Paris in April 2018 under the name of CEDRE 1 has resulted in $10.2 billion in conditioned loans and $860 million in grants from donors and multilaterals to the Lebanese Republic, to be injected in more than 250 projects among which ICT/telecommunications (Chedrawi, 2019). In this context, the ministry of telecommunications through its "National Cloud Platform" ($200M) will offer a national cloud based data center to be used by Government and nongovernmental institutions. This platform will create local and regional platforms to overcome business dependence on imported digital services.

According to IDAL (2017), the Lebanese ICT market has contributed to 3% of Lebanon's GDP in 2013, valued at USD 436.2 million in 2016. The Demand for more advanced services like cloud services were estimated to upsurge and grow to more than USD 600 million by 2020. In fact, many companies across industries in Lebanon have moved to the cloud.

3. RESULTS AND DISCUSSION

Building on our qualitative empirical data collected from interviewing the decision maker of the ten case companies, this article shows that CC enables IT companies to interact and engage in co-creating value with each other, it identifies the rising opportunity for the underlying IT service providers' in Lebanon to move from traditional to CC benefiting from the CEDRE conference output and the fund created within the Beirut Arab Economic and Social Summit (BAESS).

3.1. Cloud Computing: a value co-creating opportunity

The results show that CC enables merged interaction of resources, processes and outcomes between the vendor, the cloud infrastructure provider, the IT service provider and their client enterprise in order to reduce cost and co-create value. The research results suggest that CC stakeholders co-create value in a joint sphere when their activities are like aligned.

The CC relevant stakeholders are becoming more and more dependent on each other; this is clearly mentioned by many interviewees: "*vendors, cloud infrastructure providers and even IT service providers can no longer function as independent company that can deliver separate products and services but have become dependent on each other*" (E8); "*CC creates a joint sphere between all stakeholders*" (E5).

CC triggers value co-creation through visible and invisible components (software, cloud services interfaces, help desks, and customer support) that client companies interact with during the co-creation process. "*CC is affecting our value creation*" (E1); "*CC Leverage a digital platform. This common interface includes software, services, and customer support*" (E2). It reduces costs of information processing allowing a transformation in the way stakeholders operate and in how values are exchanged. It unlocks the opportunity for value co-creation between stakeholders: "*the value co-creation opportunities in the CC era may result from the reduction of costs of interactions, combinations of information, reconfigurations of products and services, the redesign of transactions and the ability to integrate resources and capabilities among suppliers, competitors and customers*" (E1); "*value is exchanged in a new way, the co-creation becomes possible in practice*" (E8).

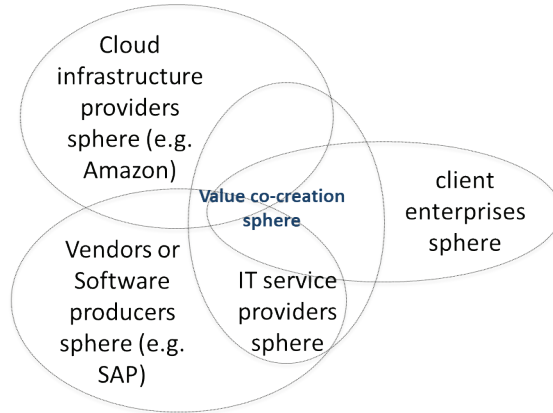The CC value co-creation sphere is represented in figure 2 below:

Figure 2: The value co-creation sphere of the cloud era

The traditional value chain for IT services, extending from consulting, design and implementation of solutions and IT infrastructures to application maintenance, is changing as a result of CC concepts. A new cloud-based value chain/sphere is emerging. This radical game changer implies the metamorphosis of the traditional IT value chain and the transformation of the relationships between actors in the chain. In the CC era, the fact that technical aspects related to the Cloud implementation are developed by the Cloud service provider and by vendors while creating their joint offer allows the client enterprise to focus more on their business goals that can be obtained through CC services. *"The need to consulting, negotiation, and analysis is filled by the IT service provider" (E4).*

Each stakeholder must redesign his business model, which will be significantly different from the traditional business model. Cloud value chain is a revolution in terms of efficiency of outsourcing IT: the revolution is in the fact that IT is delivered as a service. *"Clients plug their computers to the cloud and focus on their customers to satisfy their needs with the limited resources they have" (E9).*

3.2. CC BARRIERS AND BENEFITS

Before shifting from a traditional value chain to a cloud-based value chain, client enterprises should first identify barriers and benefits for migrating to the cloud. In fact, client enterprises should weigh all the factors to assess the implementation of CC in their value chain. Questions about the barriers and the challenges of the cloud-based chain that clients have to face when using CC should be answered well before taking the critical decision of moving to the cloud.

Client companies still consider many barriers for CC adoption, such as: 1) availability of on-demand high quality services; 2) possibilities for client companies to change from one CC provider to another; 3) data control; 4) availability of high-speed communication networks, and 5) security.

"There is a lack of acceptance of the cloud concept. They do not accept yet that the service quality can be high" (E3); "The problem is also related to the lack of availability of high-speed communication networks. This is a major problem" (E7); "Companies consider security as the main problem" (E1).

Our results show that security and the availability of high-speed communication networks remain as the main barriers for CC adoption in Lebanon. Indeed, adoption of CC in developing countries depends on the availability of secured and high-speed communication networks. CC stakeholders expect that their country continue to invest in such networks and continue to secure and to upgrade them; CEDRE and the BAESS funds should take care of that.

But client companies consider also the many benefits that they obtain when adopting the CC, such as: 1) low investments as client companies do not need to make large investments in physical resources (servers, software, storage, and operating systems) and to update and maintain the system; 2) with CC, client companies are flexible to scale their IT infrastructure; 3) they pay for use, and 4) get access to updated IT resources, which 5) allows to allocate their resources and focus on their core business.

"Client companies do not need to make large investments in the physical technological infrastructure and do not need also to update and maintain their systems. So they can make saving on hardware and on employees' costs" (E7); "Client enterprises gain flexibility with a better access to their applications" (E1); "There are no extra fees as they pay per use" (E6); "The IT infrastructure is updated frequently by the service provider giving the advantage to clients to use the latest technologies" (E3).

These advantages of CC are of high importance for client enterprises in Lebanon. Mainly, the most important factor is the economy associated with the CC which attracts clients the most. The CC also allows the synchronization of data from multiple sources. It discharges client enterprises from the problem of transferring data manually from one system to another. It helps companies connecting their offices. It also allows working from distance: working from home.

In the past, IT service providers offered as a service a range of IT activities, including hardware and software installation, upgrades, maintenance, backup, data storage, security, design, consulting, negotiation and personalization. CC is achieving increased popularity while linking directly cloud service providers with client enterprises.

CONTRIBUTION AND CONCLUSION

In the past, only the largest and most powerful players could significantly impact the direction and evolution of the market by controlling access to information, creating strategic partnerships, changing pricing, introducing new products or services, or engaging in mergers and acquisitions. Today, all organizations have access to vast amounts of information and resources and can collaborate with new customers and partners (Gartner, 2019), therefore, with such an international exposure, Lebanese IT companies have an **excellent opportunity** to impose themselves as a regional reference through CC, leveraging the Lebanese economy and creating sustaining jobs and value added solutions and services.

Our major contribution is that through CC, companies, processes and interfaces can be assembled in a mutual interest environment that unlocks the opportunity for value co-creation between stakeholders by opening its boundaries while providing solid solutions, space for everyone and of course innovation prospects. Furthermore, building local center of excellence offers Lebanese IT companies a better alignment with vendors and big players in addition to opening unlimited opportunities for free lancers which limit qualified brain migration and create sustainable jobs for freshly graduated elite from our well reputed network of universities.

Finally, CC offers a common mutual interest for local actors to lobby through larger community to enhance local infrastructure and legalization; it allows sophistication in solutions which could consequently reflects positively on economic growth which eventually reflects positively on public debt.

The CC is a radical game changer that transforms the traditional IT value chain. Managers are encouraged to consider how the CC and the co-creation can be designed to be integrated not only on the operational level but also on the strategic level. Taking co-creation from the operational level to the strategic level can induce high level business model innovations.

To conclude, we would acknowledge that this study has some limitations, which could be addressed in future research. In particular, limitations which are inherent to the case study method and qualitative data collection procedures. Firstly, while the case study method proved to be rich in detail, the findings are based on a ten purposeful sample of firms. Thus, this study is naturally limited in terms of its statistical generalizability. Secondly, the interview participant's viewpoints are a reflection of a particular moment in time. This is highly relevant given the exploratory nature of our thesis. As cloud technology matures and becomes more embedded within a market, it is expected that these perspectives are also likely to transform with time, this is indeed a wide scope for further studies.

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