Document name	Code	Segment	Created by
Alouffi2021-A_systematic_literature_review_on_cloud_computing_s	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	ABSTRACT Cloud computing has become a widely exploited research area in academia and industry. Cloud computing benefits both cloud services providers (CSPs) and consumers. The security challenges associated with cloud computing have been widely studied in the literature.	Ivon Miranda Santos
Alouffi2021-A_systematic_literature_review_on_cloud_computing_s	MULTI-CLOUD BENEFITS > Benefits in cloud management	Portability features are provided with limited offers. Therefore, evaluation of SLAs benefits the service providers in terms of legal actions, while minimal assurance of data pro-tection for consumers is specified to reflect the consumers' requirements at the right time [13].	Ivon Miranda Santos
Alouffi2021-A_systematic_literature_review_on_cloud_computing_s	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Portability features are provided with limited offers. Therefore, evaluation of SLAs benefits the service providers in terms of legal actions, while minimal assurance of data pro-tection for consumers is specified to reflect the consumers' requirements at the right time [13].	Ivon Miranda Santos
Alouffi2021-A_systematic_literature_review_on_cloud_computing_s	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Portability features are provided with limited offers. Therefore, evaluation of SLAs benefits the service providers in terms of legal actions, while minimal assurance of data pro-tection for consumers is specified to reflect the consumers' requirements at the right time [13].	Ivon Miranda Santos
Alouffi2021-A_systematic_literature_review_on_cloud_computing_s	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Thus, the cloud provider must ensure users' information by installing data safety measures. Although CC has many deployment and implementation benefits, organizations adopting them face compliance, trust, hosting, legal, security, and privacy issues [64].	Ivon Miranda Santos
Ardagna2015-Cloud_and_multi-cloud_computing_Current_challenges_	MULTI-CLOUD BENEFITS > Hight availability	Also networks are frequently the Cloud bottleneck and data center energy management is very critical [7]. To cope with such challenges the adoption of multi-Clouds [8], has been advocated by many researchers, since deploying software on multiple Clouds overcomes single provider un-availability and allows to build cost efficient follow the sun applications. Moreover, Cloud computing is also becoming a mainstream solution to provide very large clusters in a pay per use basis to support Big data applications [9].	Ivon Miranda Santos
Ardagna2015-Cloud_and_multi-cloud_computing_Current_challenges_	MULTI-CLOUD BENEFITS > Cost efficient	Also networks are frequently the Cloud bottleneck and data center energy management is very critical [7]. To cope with such challenges the adoption of multi-Clouds [8], has been advocated by many researchers, since deploying software on multiple Clouds overcomes single provider un-availability and allows to build cost efficient follow the sun applications. Moreover, Cloud computing is also becoming a mainstream solution to provide very large clusters in a pay per use basis to support Big data applications [9].	Ivon Miranda Santos
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > cloud migration benefit	Abstract. Migrating applications to the cloud is rapidly increasing in many orga-nizations as it enables them to take advantages of the cloud, such as the lower costs and accessibility of data.	Ivon Miranda Santos
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > cloud migration benefit	The use of cloud computing is increasing rapidly in many organizations [1]. Moving an application to the cloud enables organization to make use of the advantages of the cloud like elasticity [2], lower costs, and accessibility of data.	Ivon Miranda Santos
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > Cloud services across different clouds	That is why different cloud vendors nowadays are enabling mix and match of cloud services across different clouds.	Ivon Miranda Santos
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Also, sometimes these applications require an overall architecture overhaul, which again, suffer from the lack of documentation of the current architecture.	Ivon Miranda Santos

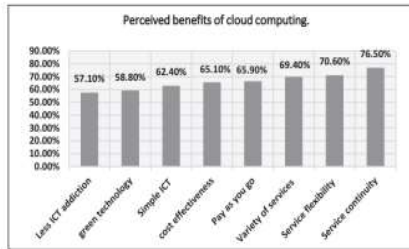|			
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Also, sometimes these applications require an overall architecture overhaul, which again, suffer from the lack of documentation of the current architecture.	Ivon Miranda Santos
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Also, sometimes these applications require an overall architecture overhaul, which again, suffer from the lack of documentation of the current architecture. Despite to momentum to shift to multi cloud, the cost-benefit analysis models illustrating the business impact of cloud adoption are still a significant risk factor [4]. It is sometimes challenging to redesign the current IT infrastructure to meet the requirement before moving to the cloud.	Ivon Miranda Santos
Asthana2021-Multi-cloud_Solution_Design_for_Migrating_a_Portfol	MULTI-CLOUD BENEFITS > Benefits in cloud management	Despite to momentum to shift to multi cloud, the cost-benefit analysis models illustrating the business impact of cloud adoption are still a significant risk factor [4].	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	Cloud computing will enable universi-ties with limited budgets to benefit from information services without making any new financial investments for informa-tion and communications technology (ICT) resources. With cloud applications in higher education, knowledge can be managed effectively to increase academic performance, effectiveness, and efficiency in universities.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Cloud computing will enable universi-ties with limited budgets to benefit from information services without making any new financial investments for informa-tion and communications technology (ICT) resources.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Cloud computing can be a solution to these challenges.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	In overcoming these challenges and providing an alternative way to operate information systems in a cost-effective manner, the role of cloud computing is great, especially for universities with budget shortages. Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos

Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Optimizing cost management	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in risk and security	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Elasticity	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Security	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al., 2016).	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Avoid vendor lock-in	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Data mangement and privacy	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Previsibility and mensurablity	Although personalized learning, being economic, elasticity, measurability, accessibility, low carbon emission, and standardization are shown as some benefits of cloud computing in the education field, security, compliance issue, lock-in, reliability, lack of skills, insufficient support of cloud service providers, policies on the cloud, privacy, and the complexity of cloud technologies are shown as some of its challenges (Njenga et al., 2019; Sabi et al.,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	Behind the desire to benefit from cloud computing in universi-ties lies mainly the willingness of universities to use their finan-cial resources cost-effectively and efficiently.	Ivon Miranda Santos

Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Behind the desire to benefit from cloud computing in universi-ties lies mainly the willingness of universities to use their finan-cial resources cost-effectively and efficiently.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Many universities are now experiencing a revolution in their information services with cloud computing. Higher education institutions need effec-tive IT governance, which is necessary for them (Bianchi & Sousa, 2016). If universities take full advantage of cloud com-puting, this will eliminate the classic University understanding.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	In such a case, there will be an increase in service diver-sity naturally. By the fifth (R5) question of the research, it is aimed to determine the possible benefits and problems that may be encountered in transferring the library services to the cloud environment. The sixth (R6), seventh (R7), and eighth (R8) research questions of the study are related to the creation of a framework for the adoption of cloud computing in the light of the data obtained from the survey.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Participants were asked to identify the benefits of cloud computing for universities (Figure 9). As the first ben-efit of cloud computing, 76.5% of the participants stated that "service continuity will be ensured in natural disasters and unexpected developments." This is followed by "service flexibility" (70.6%), "service variety" (69.4%), "paying as much as you use in information services" (65.9%), "decrease in ICT operation and maintenance expenditures" (65.1%), "execution of information services with simpler ICT tools" (62.4%), "less damage to the environment" (58.8%), and "being less dependent on ICT activities" (57.1%).	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Participants were asked to identify the benefits of cloud computing for universities (Figure 9). As the first ben-efit of cloud computing, 76.5% of the participants stated that "service continuity will be ensured in natural disasters and unexpected developments." This is followed by "service flexibility" (70.6%), "service variety" (69.4%), "paying as much as you use in information services" (65.9%), "decrease in ICT operation and maintenance expenditures" (65.1%), "execution of information services with simpler ICT tools" (62.4%), "less damage to the environment" (58.8%), and "being less dependent on ICT activities" (57.1%).	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Optimizing cost management	Participants were asked to identify the benefits of cloud computing for universities (Figure 9). As the first ben-efit of cloud computing, 76.5% of the participants stated that "service continuity will be ensured in natural disasters and unexpected developments." This is followed by "service flexibility" (70.6%), "service variety" (69.4%), "paying as much as you use in information services" (65.9%), "decrease in ICT operation and maintenance expenditures" (65.1%), "execution of information services with simpler ICT tools" (62.4%), "less damage to the environment" (58.8%), and "being less dependent on ICT activities" (57.1%).	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Flexibility	Participants were asked to identify the benefits of cloud computing for universities (Figure 9). As the first ben-efit of cloud computing, 76.5% of the participants stated that "service continuity will be ensured in natural disasters and unexpected developments." This is followed by "service flexibility" (70.6%), "service variety" (69.4%), "paying as much as you use in information services" (65.9%), "decrease in ICT operation and maintenance expenditures" (65.1%), "execution of information services with simpler ICT tools" (62.4%), "less damage to the environment" (58.8%), and "being less dependent on ICT activities" (57.1%).	Ivon Miranda Santos

Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Disaster Recovery/Security in natural disaster	Participants were asked to identify the benefits of cloud computing for universities (Figure 9). As the first ben-efit of cloud computing, 76.5% of the participants stated that "service continuity will be ensured in natural disasters and unexpected developments." This is followed by "service flexibility" (70.6%), "service variety" (69.4%), "paying as much as you use in information services" (65.9%), "decrease in ICT operation and maintenance expenditures" (65.1%), "execution of information services with simpler ICT tools" (62.4%), "less damage to the environment" (58.8%), and "being less dependent on ICT activities" (57.1%).	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	As the first ben-efit of cloud computing, 76.5% of the participants stated that "service continuity will be ensured in natural disasters and unexpected developments." This is followed by "service flexibility"	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	These results reveal that, in general, IT departments agree with the benefits of cloud computing for universities.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Figure 9. Benefits of cloud computing. Note. ICT = information and communications technology.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Universities can gain the flexibility and computing power of the CUC cloud for their basic and non-sensitive computing tasks, while they can keep their criti-cal applications and data safely behind a university firewall via CUC. Each of the PUC and CUC environments that make up this hybrid cloud architecture has its own benefits and uses.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Universities can gain the flexibility and computing power of the CUC cloud for their basic and non-sensitive computing tasks, while they can keep their criti-cal applications and data safely behind a university firewall via CUC. Each of the PUC and CUC environments that make up this hybrid cloud architecture has its own benefits and uses. By combining PUC and CUC into a single hybrid cloud, universi-ties can gain greater control over data safety, accessibility,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Universities can gain the flexibility and computing power of the CUC cloud for their basic and non-sensitive computing tasks, while they can keep their criti-cal applications and data safely behind a university firewall via CUC. Each of the PUC and CUC environments that make up this hybrid cloud architecture has its own benefits and uses. By combining PUC and CUC into a single hybrid cloud, universi-ties can gain greater control over data safety, accessibility,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Infrastructure management	Universities can gain the flexibility and computing power of the CUC cloud for their basic and non-sensitive computing tasks, while they can keep their criti-cal applications and data safely behind a university firewall via CUC. Each of the PUC and CUC environments that make up this hybrid cloud architecture has its own benefits and uses. By combining PUC and CUC into a single hybrid cloud, universi-ties can gain greater control over data safety, accessibility,	Ivon Miranda Santos

Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Flexibility	Universities can gain the flexibility and computing power of the CUC cloud for their basic and non-sensitive computing tasks, while they can keep their criti-cal applications and data safely behind a university firewall via CUC. Each of the PUC and CUC environments that make up this hybrid cloud architecture has its own benefits and uses.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Security	Universities can gain the flexibility and computing power of the CUC cloud for their basic and non-sensitive computing tasks, while they can keep their criti-cal applications and data safely behind a university firewall via CUC. Each of the PUC and CUC environments that make up this hybrid cloud architecture has its own benefits and uses. By combining PUC and CUC into a single hybrid cloud, universi-ties can gain greater control over data safety, accessibility,	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Although they mentioned some disadvantages, most of the IT departments stated that they agreed with the advan-tages of cloud computing.	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Behind the desire of universi-ties to benefit from cloud computing lies mainly their willingness to use their financial resources cost-effec-tively and efficiently. In the chi-square test done in the study, no significant dif-ference was found between the state and private universi-ties in terms of knowledge level related to cloud computing (χ2 = 0.180).	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Behind the desire of universi-ties to benefit from cloud computing lies mainly their willingness to use their financial resources cost-effec-tively and efficiently.	Ivon Miranda Santos
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Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > Infrastructure management	In the chi-square test done in the study, no significant dif-ference was found between the state and private universi-ties in terms of knowledge level related to cloud computing	Ivon Miranda Santos
Aydin2021-A_Study_of_Cloud_Computing_Adoption_in_Universities_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Support should be provided to cloud entrepreneurs to ben-efit from cloud computing in universities.	Ivon Miranda Santos
Baby2015-Multicloud_architecture_for_augmenting_security_in_clo	MULTI-CLOUD BENEFITS > Benefits in cloud management	The main obstacle that stands as a barrier for opting clouds, despite its benefits are its security challenges. Multicloud architecture is a solution that assures better security and performance at a nominal cost. There are different approaches used for storing and processing data in a multicloud environment, this paper is a study on the different multicloud architectures and their benefits and limitations.	Ivon Miranda Santos
Baby2015-Multicloud_architecture_for_augmenting_security_in_clo	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	The main challenge for this approach is that there is no general format for splitting the logic and distributing among the clouds [6], therefore proper analysis of how the application logic can be divided among the clouds remain a headache for the users. The main two benefits in partitioning the application logic are, the cloud provider cannot understand the overall calculated result, and no cloud provider learns the application logic completely. Another main case where splitting of application logic is used is in secure multiparty computations, this was initially used up in solving millionaires problem [7].T	Ivon Miranda Santos

Baby2015-Multicloud_architecture_for_augmenting_security_in_clo	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	In vertical fragmentation the columns are split and distributed to the clouds such that no single cloud learns the relationship between the stored data. The main benefit here is that no cloud providers gain access to all data, thus maintains the confidentiality of data, however data that refers to real-time application can be understood by some external knowledge, therefore database splitting is also not a good solution for storing highly confidential information. In Cryptographic Data Splitting is, for better security the cryptographic key could remain with the user and make provision such that it is made online as required, for the clouds if needed for processing [10].T	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > cloud computing benefit	We argue that it should be possible for users situated in such settings to take advantage of the benefits offered by cloud-based computing models through creation of appropriate abstraction service layers.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	In the above scenario, the APDD system can be broken into independent microservices each with different data jurisdiction policies.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	In the above scenario, the APDD system can be broken into independent microservices each with different data jurisdiction policies. For instance, the data storage and management microservice needs to be enforced to remain within the boundaries of the country while the plant disease prediction service can run in a public cloud without restrictions and benefit from the rich machine learning libraries and tools. Such a setup would require a multi-cloud environment that spawns boundaries with support for data jurisdiction policies specific to a microservice and use case.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	In the above scenario, the APDD system can be broken into independent microservices each with different data jurisdiction policies.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Multiple cloud service providers	In the above scenario, the APDD system can be broken into independent microservices each with different data jurisdiction policies. For instance, the data storage and management microservice needs to be enforced to remain within the boundaries of the country while the plant disease prediction service can run in a public cloud without restrictions and benefit from the rich machine learning libraries and tools. Such a setup would require a multi-cloud environment that spawns boundaries with support for data jurisdiction policies specific to a microservice and use case.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Legal restrictions / Data jurisdiction restrictions	In the above scenario, the APDD system can be broken into independent microservices each with different data jurisdiction policies. For instance, the data storage and management microservice needs to be enforced to remain within the boundaries of the country while the plant disease prediction service can run in a public cloud without restrictions and benefit from the rich machine learning libraries and tools. Such a setup would require a multi-cloud environment that spawns boundaries with support for data jurisdiction policies specific to a microservice and use case.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Data mangement and privacy	In the above scenario, the APDD system can be broken into independent microservices each with different data jurisdiction policies. For instance, the data storage and management microservice needs to be enforced to remain within the boundaries of the country while the plant disease prediction service can run in a public cloud without restrictions and benefit from the rich machine learning libraries and tools. Such a setup would require a multi-cloud environment that spawns boundaries with support for data jurisdiction policies specific to a microservice and use case.	Ivon Miranda Santos

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Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Many organizations are recently adopting microservice architec-tures in place of traditional monolithic architectures so as to truly reap from the benefits of modern cloud services.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Many organizations are recently adopting microservice architec-tures in place of traditional monolithic architectures so as to truly reap from the benefits of modern cloud services.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Microservice architec-tures involve collaborations between different fine-grained and inde-pendently deployable modules usually without a centralized controller to achieve the desired overall functionality of the system (Nadareishvili et al.,	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Microservice architec-tures involve collaborations between different fine-grained and inde-pendently deployable modules usually without a centralized controller to achieve the desired overall functionality of the system (Nadareishvili et al.,	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Infrastructure management	Microservice architec-tures involve collaborations between different fine-grained and inde-pendently deployable modules usually without a centralized controller to achieve the desired overall functionality of the system (Nadareishvili et al.,	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud management	,	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud management	A number of popular technology com-panies such as Uber, Spotify, Netflix, Amazon and Ebay are now using microservices at the core of their business processes and have achieved differing levels of reliability and scalability in their services (Knoche and Hasselbring, 2019).	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	A number of popular technology com-panies such as Uber, Spotify, Netflix, Amazon and Ebay are now using microservices at the core of their business processes and have achieved differing levels of reliability and scalability in their services (Knoche and Hasselbring, 2019). As part of the inceptor team of the microservice terminology, Fowler and Lewis (2014) identified the following key properties and benefits of microservice applications:	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	A number of popular technology com-panies such as Uber, Spotify, Netflix, Amazon and Ebay are now using microservices at the core of their business processes and have achieved differing levels of reliability and scalability in their services (Knoche and Hasselbring, 2019). As part of the inceptor team of the microservice terminology, Fowler and Lewis (2014) identified the following key properties and benefits of microservice applications:	Ivon Miranda Santos

Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Multiple cloud service providers	A number of popular technology com-panies such as Uber, Spotify, Netflix, Amazon and Ebay are now using microservices at the core of their business processes and have achieved differing levels of reliability and scalability in their services (Knoche and Hasselbring, 2019). As part of the inceptor team of the microservice terminology, Fowler and Lewis (2014) identified the following key properties and benefits of microservice applications:	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Scalability	A number of popular technology com-panies such as Uber, Spotify, Netflix, Amazon and Ebay are now using microservices at the core of their business processes and have achieved differing levels of reliability and scalability in their services (Knoche and Hasselbring, 2019). As part of the inceptor team of the microservice terminology, Fowler and Lewis (2014) identified the following key properties and benefits of microservice applications:	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	The movement of one service, such as the one instance of the prediction microservice for automated plant diagnosis system from Cluster 2 to Cluster 1 as shown in Fig. 5, should cause minimal or no downtime and should not compromise the QoS attributes tagged to overall operation of the system. As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud management	5, should cause minimal or no downtime and should not compromise the QoS attributes tagged to overall operation of the system. As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	5, should cause minimal or no downtime and should not compromise the QoS attributes tagged to overall operation of the system. As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > cloud computing benefit	As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure.	Ivon Miranda Santos

Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Multiple cloud service providers	As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Scalability	As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Disaster Recovery/Security in natural disaster	As noted earlier, cloud computing offers significant benefits such as scalability, disaster recovery, mobility and cost reduction in operation of an organization's IT infrastructure. This is evidenced in the introduction of different cloud computing technologies and deployments to make it easy for organizations to embrace and adopt this new wave of handling com-pute, storage and network workloads	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	(2018) proposed a solution that considers a finite catalog of primitive microservices and designs a hybrid scheduling algorithm that matches tasks to resources based on task history and availability of resources. In addition to benefits of using a microservice architecture, the paper asserted that costs can further be reduced by placing data closer to processing points based on user density.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	(2018) proposed a solution that considers a finite catalog of primitive microservices and designs a hybrid scheduling algorithm that matches tasks to resources based on task history and availability of resources. In addition to benefits of using a microservice architecture, the paper asserted that costs can further be reduced by placing data closer to processing points based on user density.	Ivon Miranda Santos
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Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Optimizing cost management	(2018) proposed a solution that considers a finite catalog of primitive microservices and designs a hybrid scheduling algorithm that matches tasks to resources based on task history and availability of resources. In addition to benefits of using a microservice architecture, the paper asserted that costs can further be reduced by placing data closer to processing points based on user density.	Ivon Miranda Santos

Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Hight availability	(2018) proposed a solution that considers a finite catalog of primitive microservices and designs a hybrid scheduling algorithm that matches tasks to resources based on task history and availability of resources. In addition to benefits of using a microservice architecture, the paper asserted that costs can further be reduced by placing data closer to processing points based on user density.	Ivon Miranda Santos
Bainomugisha2022-Crane_cloud_A_resilient_multicloud_service_abs	MULTI-CLOUD BENEFITS > Cost efficient	(2018) proposed a solution that considers a finite catalog of primitive microservices and designs a hybrid scheduling algorithm that matches tasks to resources based on task history and availability of resources. In addition to benefits of using a microservice architecture, the paper asserted that costs can further be reduced by placing data closer to processing points based on user density.	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud management	The microservices architecture is one of the first service-based architectural styles that has been introduced, applied in practice, and become popular when the DevOps practices gained momentum in the software industry. Migrating monolithic architectures to cloud-native architectures like microservices brings in many benefits such as flexibility to adapt to the technological changes and independent resource management for different system components.	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The microservices architecture is one of the first service-based architectural styles that has been introduced, applied in practice, and become popular when the DevOps practices gained momentum in the software industry. Migrating monolithic architectures to cloud-native architectures like microservices brings in many benefits such as flexibility to adapt to the technological changes and independent resource management for different system components. Here, we report our experiences and lessons learned during incremental migration and architectural refactoring of a commercial Mobile Backend as a Service to microservices.	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	The microservices architecture is one of the first service-based architectural styles that has been introduced, applied in practice, and become popular when the DevOps practices gained momentum in the software industry. Migrating monolithic architectures to cloud-native architectures like microservices brings in many benefits such as flexibility to adapt to the technological changes and independent resource management for different system components. Here, we report our experiences and lessons learned during incremental migration and architectural refactoring of a commercial Mobile Backend as a Service to microservices.	Ivon Miranda Santos
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Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud management	Here, we report our experiences and lessons learned during incremental migration and architectural refactoring of a commercial Mobile Backend as a Service to microservices.	Ivon Miranda Santos

Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	In this setting, each service is a business capability that can utilize various programming languages and data stores and is developed by a small team [2]. Migrating monolithic architectures to microservices brings in many benefits including, but not limited to flexibility to adapt to the technological changes in order to avoid technology lock-in, and more importantly, reduced time-to-market, and better development team structuring around services [3]. Here we explain our experiences and lessons learned during incremental migration of the Backtory (http:	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	In this setting, each service is a business capability that can utilize various programming languages and data stores and is developed by a small team [2]. Migrating monolithic architectures to microservices brings in many benefits including, but not limited to flexibility to adapt to the technological changes in order to avoid technology lock-in, and more importantly, reduced time-to-market, and better development team structuring around services [3]. Here we explain our experiences and lessons learned during incremental migration of the Backtory (http:	Ivon Miranda Santos
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Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Avoid vendor lock-in	In this setting, each service is a business capability that can utilize various programming languages and data stores and is developed by a small team [2]. Migrating monolithic architectures to microservices brings in many benefits including, but not limited to flexibility to adapt to the technological changes in order to avoid technology lock-in, and more importantly, reduced time-to-market, and better development team structuring around services [3]. Here we explain our experiences and lessons learned during incremental migration of the Backtory (http:	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud management	Here we explain our experiences and lessons learned during incremental migration of the Backtory (http:	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud management	By utilizing containers, we could deploy service instances with lower overheads than the virtualization, and with a better isolation. Another major benefit is the portability since we could deploy anywhere that supports containerization without any changes to our source codes or container images. Docker is a tool for the containerization of applications [12].	Ivon Miranda Santos
Balalaie2016-Microservices_architecture_enables_devops_Migratio	MULTI-CLOUD BENEFITS > Benefits in cloud management	Moreover, in the microservices setting, as each team would be responsible for their own services, they cannot benefit from the higher comprehensibility of the code and easier joining of new team members which is caused by the decomposition of the system. In contrast, DevOps recommends vertical dividing of project members into small cross-functional teams which also fits microservices well.	Ivon Miranda Santos

Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	This new architecture has been widely adopted in the case of complex and heterogeneous projects by companies such as Netflix [3], Spotify [4] or Uber [5]. Indeed, microservices provide many benefits for Cloud-based applications, such as better scalability, autonomy and deployment times [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	This new architecture has been widely adopted in the case of complex and heterogeneous projects by companies such as Netflix [3], Spotify [4] or Uber [5]. Indeed, microservices provide many benefits for Cloud-based applications, such as better scalability, autonomy and deployment times [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Multiple cloud service providers	This new architecture has been widely adopted in the case of complex and heterogeneous projects by companies such as Netflix [3], Spotify [4] or Uber [5]. Indeed, microservices provide many benefits for Cloud-based applications, such as better scalability, autonomy and deployment times [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Scalability	This new architecture has been widely adopted in the case of complex and heterogeneous projects by companies such as Netflix [3], Spotify [4] or Uber [5]. Indeed, microservices provide many benefits for Cloud-based applications, such as better scalability, autonomy and deployment times [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud management	Indeed, microservices provide many benefits for Cloud-based applications, such as better scalability, autonomy and deployment times [6]. As a result, such architectures are a good fit for DevOps practices [7].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud management	Such architectures are currently becoming a standard in soft-ware engineering. In [7], the authors emphasize the benefits that microservices architectures can bring to DevOps practices. For instance, microservices are known for their ability to deal with scalability [6], i.e. the ability to make the size of the system evolve as the project evolves.	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Such architectures are currently becoming a standard in soft-ware engineering. In [7], the authors emphasize the benefits that microservices architectures can bring to DevOps practices. For instance, microservices are known for their ability to deal with scalability [6], i.e. the ability to make the size of the system evolve as the project evolves.	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Such architectures are currently becoming a standard in soft-ware engineering. In [7], the authors emphasize the benefits that microservices architectures can bring to DevOps practices. For instance, microservices are known for their ability to deal with scalability [6], i.e. the ability to make the size of the system evolve as the project evolves.	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Scalability	Such architectures are currently becoming a standard in soft-ware engineering. In [7], the authors emphasize the benefits that microservices architectures can bring to DevOps practices. For instance, microservices are known for their ability to deal with scalability [6], i.e. the ability to make the size of the system evolve as the project evolves.	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > DevOps	Such architectures are currently becoming a standard in soft-ware engineering. In [7], the authors emphasize the benefits that microservices architectures can bring to DevOps practices. For instance, microservices are known for their ability to deal with scalability [6], i.e. the ability to make the size of the system evolve as the project evolves.	Ivon Miranda Santos

Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud management	This ability is crucial in a DevOps-driven development, to quickly adapt a system to its usage. In addition to such technical benefits, microservices also allow for more process-related benefits, such as the distribution of the workforce into small and self-managed teams, each focused on a microservice. This fits very well DevOps practices which recommend to vertically divide the workforce into small cross functional teams [18].	Ivon Miranda Santos
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Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > DevOps	This ability is crucial in a DevOps-driven development, to quickly adapt a system to its usage. In addition to such technical benefits, microservices also allow for more process-related benefits, such as the distribution of the workforce into small and self-managed teams, each focused on a microservice. This fits very well DevOps practices which recommend to vertically divide the workforce into small cross functional teams [18].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud management	Indeed, while the transition to microservice can bring significant improvements to the application in the long term, and ease future developments, transition from legacy systems towards microservice architecture is a long and risky process [9]. Thus, companies often establish cost-benefit analysis, based on the potential benefits such as increased performances, better scalability and ease of the development process [6]. b) Modernization Planning:	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Indeed, while the transition to microservice can bring significant improvements to the application in the long term, and ease future developments, transition from legacy systems towards microservice architecture is a long and risky process [9]. Thus, companies often establish cost-benefit analysis, based on the potential benefits such as increased performances, better scalability and ease of the development process [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Indeed, while the transition to microservice can bring significant improvements to the application in the long term, and ease future developments, transition from legacy systems towards microservice architecture is a long and risky process [9]. Thus, companies often establish cost-benefit analysis, based on the potential benefits such as increased performances, better scalability and ease of the development process [6].	Ivon Miranda Santos
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Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Optimizing cost management	Indeed, while the transition to microservice can bring significant improvements to the application in the long term, and ease future developments, transition from legacy systems towards microservice architecture is a long and risky process [9]. Thus, companies often establish cost-benefit analysis, based on the potential benefits such as increased performances, better scalability and ease of the development process [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Scalability	Indeed, while the transition to microservice can bring significant improvements to the application in the long term, and ease future developments, transition from legacy systems towards microservice architecture is a long and risky process [9]. Thus, companies often establish cost-benefit analysis, based on the potential benefits such as increased performances, better scalability and ease of the development process [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Increase performance	Indeed, while the transition to microservice can bring significant improvements to the application in the long term, and ease future developments, transition from legacy systems towards microservice architecture is a long and risky process [9]. Thus, companies often establish cost-benefit analysis, based on the potential benefits such as increased performances, better scalability and ease of the development process [6].	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	b) Modernization Planning:	Ivon Miranda Santos
Belafia2021-From_monolithic_to_microservice_architecture_The_ca	MULTI-CLOUD BENEFITS > Benefits in cloud management	The authors of the paper have already identified two factors as responsible for this disparity: the statelessness of the services and the lack of optimization for the deployment.	Ivon Miranda Santos
Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users.	Ivon Miranda Santos
Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by the cloud, modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points. Current cloud technologies suffer from a lack of standardization, with different providers offering similar resources in a different manner [2].	Ivon Miranda Santos
Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Scalability	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by the cloud, modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points. Current cloud technologies suffer from a lack of standardization, with different providers offering similar resources in a different manner [2].	Ivon Miranda Santos

Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Flexibility	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by the cloud, modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points. Current cloud technologies suffer from a lack of standardization, with different providers offering similar resources in a different manner [2].	Ivon Miranda Santos
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Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by the cloud, modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points.	Ivon Miranda Santos
Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by the cloud, modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points.	Ivon Miranda Santos
Brogi2014-Seaclouds_Seamless_adaptive_multi-cloud_management_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	TOSCA-compliant instance of the SeaClouds service orchestration model. In TOSCA, issues like portability and service composition might benefit from some of the adaptation techniques in SeaClouds, driving the design of the model for specifying cloud service orchestrations. Also the composition of service templates could be improved with a dynamic reconfiguration mechanism, providing more flexible conditions to substitute service templates.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by different clouds that offer different services, the modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points. 1	Ivon Miranda Santos

Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by different clouds that offer different services, the modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points. 1	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by different clouds that offer different services, the modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Scalability	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by different clouds that offer different services, the modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Reduce time-to-market and provides on-demand	The cloud assists to reduce time-to-market and provides on-demand scalability at a low cost for the users. Due to its prospective benefits and potential, cloud computing is a hot research area. Many private and public clouds have emerged during the last years, offering a range of different services at SaaS, PaaS and IaaS levels aimed at matching different user requirements. To take full benefit of the flexibility provided by different clouds that offer different services, the modules of a complex application should be deployed on multiple clouds depending on their characteristics and strong points.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > cloud computing benefit	Due to its prospective benefits and potential, cloud computing is a hot research area.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > cloud computing benefit	Reconfiguration may imply updating a service, dynamically replacing malfunctioning services or migrating them to a different cloud provider to leverage its advantages or avoid the shortcomings of another cloud provider.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	This allows organisations to embrace cloud solutions and avoid risks of unreliability and vendor lock-in. By solving the problems caused by the multiple-vendor scenario, the SeaClouds architecture would benefit not only application developers and cloud providers, but also the whole market, by reducing the adoption barrier for new players.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	This allows organisations to embrace cloud solutions and avoid risks of unreliability and vendor lock-in.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applicatio ns_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	By solving the problems caused by the multiple-vendor scenario, the SeaClouds architecture would benefit not only application developers and cloud providers, but also the whole market, by reducing the adoption barrier for new players.	Ivon Miranda Santos

Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	extending and incorporating CAMP, we can cover all future CAMP-compliant providers or tools, allowing application developers to manage applications hosted on multiple clouds environments. Furthermore, by leveraging CAMP, SeaClouds will attract a significant user base (as this standard has a lot of interest but no reference implementations, so far) and advance the standard, ensuring the long-term viability of the benefits implied in SeaClouds, i.e.,	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	extending and incorporating CAMP, we can cover all future CAMP-compliant providers or tools, allowing application developers to manage applications hosted on multiple clouds environments. Furthermore, by leveraging CAMP, SeaClouds will attract a significant user base (as this standard has a lot of interest but no reference implementations, so far) and advance the standard, ensuring the long-term viability of the benefits implied in SeaClouds, i.e., management and monitoring of underlying providers, performance optimisation, low impact on the code, formal methods support, flexibility to include new services and react to problems at runtime.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud management	Furthermore, by leveraging CAMP, SeaClouds will attract a significant user base (as this standard has a lot of interest but no reference implementations, so far) and advance the standard, ensuring the long-term viability of the benefits implied in SeaClouds, i.e., management and monitoring of underlying providers, performance optimisation, low impact on the code, formal methods support, flexibility to include new services and react to problems at runtime.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Furthermore, by leveraging CAMP, SeaClouds will attract a significant user base (as this standard has a lot of interest but no reference implementations, so far) and advance the standard, ensuring the long-term viability of the benefits implied in SeaClouds, i.e., management and monitoring of underlying providers, performance optimisation, low impact on the code, formal methods support, flexibility to include new services and react to problems at runtime.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > cloud computing benefit	SeaClouds will take advantage of the compatibility and reuse of relevant tools and APIs provided by them, and also obtain a good user base. On the other hand, SeaClouds will definitely be able to contribute back to them. For example, Brooklyn only targets the IaaS level and has no support for orchestration. Beyond what Brooklyn provides, SeaClouds will therefore extend policy-driven functionality to the PaaS level and also add support for adaptation and orchestration. Thus, Brooklyn can benefit from integrating the proposed functionalities, especially regarding the integration of adaptation techniques in supported policies, thereby increasing the adoption rates and the market size of the Brooklyn platform.	Ivon Miranda Santos
Brogi2015-Adaptive_management_of_applications_across_multiple_c	MULTI-CLOUD BENEFITS > cloud computing benefit	The proposed architecture can well support this process, and also the exploitation of the best available offering for each application component at any time. Please note that, thanks to the seamless distribution over several different PaaS platforms, applications developed in SeaClouds will also take advantage of higher availability (via inter-PaaS redundancy), higher security (via inter-PaaS data partition) and higher throughput (via inter-PaaS load balancing).	Ivon Miranda Santos
Caceres2022-State-of-the-art_architectures_for_interoperability	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	This article describes emerging architectures of cloud infrastructure that give customers flexibility to use more services than a single cloud provider offers. Each architecture allows a certain degree of multi-cloud integrations, and each comes with own benefits and caveats.	Ivon Miranda Santos

Caceres2022-State-of-the-art_architectures_for_interoperability	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	This article describes emerging architectures of cloud infrastructure that give customers flexibility to use more services than a single cloud provider offers. Each architecture allows a certain degree of multi-cloud integrations, and each comes with own benefits and caveats. We will discuss limitations of emerging cloud architectures, and present existing solutions to address them.	Ivon Miranda Santos
Caceres2022-State-of-the-art_architectures_for_interoperability	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	This article describes emerging architectures of cloud infrastructure that give customers flexibility to use more services than a single cloud provider offers. Each architecture allows a certain degree of multi-cloud integrations, and each comes with own benefits and caveats.	Ivon Miranda Santos
Caceres2022-State-of-the-art_architectures_for_interoperability	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	We will discuss limitations of emerging cloud architectures, and present existing solutions to address them.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	While the cloud brings several benefits, there are still some challenges that need to be overcome to apply the cloud model in certain scenarios. One such problem is the so-called vendor lock-in since different cloud providers offer peculiar and often incompatible services, which results in the automatic migration impossibility of the application between cloud providers.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	One such problem is the so-called vendor lock-in since different cloud providers offer peculiar and often incompatible services, which results in the automatic migration impossibility of the application between cloud providers.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	One such problem is the so-called vendor lock-in since different cloud providers offer peculiar and often incompatible services, which results in the automatic migration impossibility of the application between cloud providers.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	According to (Opara-Martins et al., 2015), vendor lock-in is one of the barriers to the adoption of cloud computing. The research further points out that organizations' desire to adopt the cloud for their benefit is primarily related to capacity, scalability, and speed, but they consider urgent the vendor lock-in treatment. One method for treating vendor lock-in is the use of multiple clouds, although a small number of en-terprises adopt this approach, their popularity is in-creasing.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	, 2015), vendor lock-in is one of the barriers to the adoption of cloud computing. The research further points out that organizations' desire to adopt the cloud for their benefit is primarily related to capacity, scalability, and speed, but they consider urgent the vendor lock-in treatment.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	, 2015), vendor lock-in is one of the barriers to the adoption of cloud computing.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The research further points out that organizations' desire to adopt the cloud for their benefit is primarily related to capacity, scalability, and speed, but they consider urgent the vendor lock-in treatment. One method for treating vendor lock-in is the use of multiple clouds, although a small number of en-terprises adopt this approach, their popularity is in-creasing.	Ivon Miranda Santos
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deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud management	One method for treating vendor lock-in is the use of multiple clouds, although a small number of en-terprises adopt this approach, their popularity is in-creasing.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	One method for treating vendor lock-in is the use of multiple clouds, although a small number of en-terprises adopt this approach, their popularity is in-creasing.	Ivon Miranda Santos

deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > cloud computing benefit	For that matter, the applications are built with the focus on integration with the cloud model, to obtain full cloud advantages; it, also ensures other fe-atures labeled as IDEAL (Isolated state, Distribution, Elasticity, Automated management, Loose coupling).	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > multi-cloud benefit	In this manner, the native cloud application can faci-litate the application deployment in multiple clouds, hence help treat interoperability and portability (Feh-ling et al., 2014).	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > multi-cloud benefit	Multiple clouds enable applications to take advantage of the best features of different components provided by several cloud providers.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The third delivery model, called inter-cloud, can be on both a cloud federation and multi-cloud, but the scalable and opportunistic services must be dynamic, and inter-cloud must possess the cloud broker, which is an in-termediary actor in the relationship between the pro-vider and the consumer. The use of multiple clouds brings several advanta-ges, and through them, we can achieve the full bene-fits of cloud properties such as elasticity and pay-as-you-go (Mezg´ar and Rauschecker, 2014), (Silva et al., 2013).	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	The third delivery model, called inter-cloud, can be on both a cloud federation and multi-cloud, but the scalable and opportunistic services must be dynamic, and inter-cloud must possess the cloud broker, which is an in-termediary actor in the relationship between the pro-vider and the consumer. The use of multiple clouds brings several advanta-ges, and through them, we can achieve the full bene-fits of cloud properties such as elasticity and pay-as-you-go (Mezg´ar and Rauschecker, 2014), (Silva et al.,	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	The use of multiple clouds brings several advanta-ges, and through them, we can achieve the full bene-fits of cloud properties such as elasticity and pay-as-you-go (Mezg´ar and Rauschecker, 2014), (Silva et al., 2013).	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > multi-cloud benefit	The use of multiple clouds brings several advanta-ges, and through them, we can achieve the full bene-fits of cloud properties such as elasticity and pay-as-you-go (Mezg´ar and Rauschecker, 2014), (Silva et al.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Optimizing cost management	The use of multiple clouds brings several advanta-ges, and through them, we can achieve the full bene-fits of cloud properties such as elasticity and pay-as-you-go (Mezg´ar and Rauschecker, 2014), (Silva et al., 2013).	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Elasticity	The use of multiple clouds brings several advanta-ges, and through them, we can achieve the full bene-fits of cloud properties such as elasticity and pay-as-you-go (Mezg´ar and Rauschecker, 2014), (Silva et al., 2013).	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Definition (Microservices): are a set of autonomous, independent, self-contained services, in which each service has a single goal, is loosely coupled, and inte-ract to build a distributed application.	Ivon Miranda Santos
deCarvalho2018-Pacificclouds_A_flexible_microservices_based_arc	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Definition (Microservices): are a set of autonomous, independent, self-contained services, in which each service has a single goal, is loosely coupled, and inte-ract to build a distributed application.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Method: In our pre-vious work, we performed a systematic review to identify the approaches adopted by organizations to migrate to cloud computing and their per-ception of the cost-benefit of this migration. In this paper, we extended our previous work through a new search in the selected repositories to identify studies published from June 2015 to June 2016.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	In our pre-vious work, we performed a systematic review to identify the approaches adopted by organizations to migrate to cloud computing and their per-ception of the cost-benefit of this migration.	Ivon Miranda Santos

dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	In our pre-vious work, we performed a systematic review to identify the approaches adopted by organizations to migrate to cloud computing and their per-ception of the cost-benefit of this migration.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud migration benefit	In our pre-vious work, we performed a systematic review to identify the approaches adopted by organizations to migrate to cloud computing and their per-ception of the cost-benefit of this migration.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	The results in this systematic literature review can help the development of guidelines to support newcomers companies to adopt and migrate to the cloud, how the cost-benefit relationship can be evaluated as well as the selection of providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The results in this systematic literature review can help the development of guidelines to support newcomers companies to adopt and migrate to the cloud, how the cost-benefit relationship can be evaluated as well as the selection of providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Keywords: Cloud computing · Cloud migration · Provider selection · Cost-benefit relationship · Systematic literature review 1 Introduction	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	Cloud computing · Cloud migration · Provider selection · Cost-benefit relationship · Systematic literature review	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Cloud computing · Cloud migration · Provider selection · Cost-benefit relationship · Systematic literature review	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Cloud computing · Cloud migration · Provider selection · Cost-benefit relationship · Systematic literature review	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud migration benefit	Cloud computing · Cloud migration · Provider selection · Cost-benefit relationship · Systematic literature review	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	However, the identification of opportunities for migration, the reasoning of an attractive cost-benefit relation-ship and the selection of service providers that best fit their needs are not trivial tasks [16,17].	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	However, the identification of opportunities for migration, the reasoning of an attractive cost-benefit relation-ship and the selection of service providers that best fit their needs are not trivial tasks [16,17].	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	However, the identification of opportunities for migration, the reasoning of an attractive cost-benefit relation-ship and the selection of service providers that best fit their needs are not trivial tasks [16,17]. The selection of commercial cloud providers is a challenging task and depends on several variables and indicators.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The selection of commercial cloud providers is a challenging task and depends on several variables and indicators.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	[7,14,17].	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	The reason for a Systematic Literature Review (SLR) is the necessity to iden-tify, classify, and compare existing evidence on the strategies used by companies to identify scenarios of migration opportunities to the CC. To justify the adop-tion, a set of factors should be considered for the assessment of the cost-benefit relationship.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Moreover, companies should be able to select a provider according to their needs and profile.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	This paper has three major contributions: (i) the identification of strategies and issues that companies have considered to migrate to the cloud; (ii) factors that should be considered in the cost-benefits relationship while adopting and migrating to the cloud; (iii) and finally aspects related to the selection of cloud computing service providers.	Ivon Miranda Santos

dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	(i) the identification of strategies and issues that companies have considered to migrate to the cloud; (ii) factors that should be considered in the cost-benefits relationship while adopting and migrating to the cloud; (iii) and finally aspects related to the selection of cloud computing service providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	(i) the identification of strategies and issues that companies have considered to migrate to the cloud; (ii) factors that should be considered in the cost-benefits relationship while adopting and migrating to the cloud; (iii) and finally aspects related to the selection of cloud computing service providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Private clouds provide the advantages of public clouds, but still incur capital expenditures [20]; (iii) Community cloud is used and controlled by a group of enterprises, which have shared interests [20]; (iv) Hybrid cloud is a combination of public and private cloud [20]. This paper focuses on public cloud providers and the three types of CC services: SaaS, PaaS and IaaS.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > multi-cloud benefit	Private clouds provide the advantages of public clouds, but still incur capital expenditures [20]; (iii) Community cloud is used and controlled by a group of enterprises, which have shared interests [20]; (iv) Hybrid cloud is a combination of public and private cloud [20]. This paper focuses on public cloud providers and the three types of CC services: SaaS, PaaS and IaaS.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	For this end, the study present different approaches, techniques and tools to overcome diffi-culties and challenges in the context of CC. The scope of this review is specific to identify strategies that can help organizations to migrate and adopt CC, their perception of the cost-benefit relationship of this adoption and how com-panies can select service providers that best fit their needs and profile.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	A Systematic Literature Review on Cloud Computing 225 (i) strategies to identify migration opportunities to the cloud, (ii) relevant fac-tors for the assessment of the cost-benefit of this adoption of cloud and finally (iii) the selection of providers according to their needs and profile. Specifying the Research Questions.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	(i) strategies to identify migration opportunities to the cloud, (ii) relevant fac-tors for the assessment of the cost-benefit of this adoption of cloud and finally (iii) the selection of providers according to their needs and profile.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	(i) strategies to identify migration opportunities to the cloud, (ii) relevant fac-tors for the assessment of the cost-benefit of this adoption of cloud and finally (iii) the selection of providers according to their needs and profile.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud migration benefit	(i) strategies to identify migration opportunities to the cloud, (ii) relevant fac-tors for the assessment of the cost-benefit of this adoption of cloud and finally (iii) the selection of providers according to their needs and profile.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	RQ2. Which factors companies consider to assess the cost-benefit relationship of adoption and migration to the cloud computing? The knowledge of the costs and benefits of migration to the CC can be used as a support for its planning and reference for other companies.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	They performed a case study to demonstrate the migrating feasi-bility from a classic web service solution to the Cloud.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	The categories were used as an input to a four stage technique that shall help compare CSBs on preference and usability parameters.	Ivon Miranda Santos

dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	nt Google App Engine for Java. [S63] combined the theoretical approach from scientifically recognized literature with a practical evaluation of influences on the diffusion and acceptance of CC among SMEs. [S64] discussed the main factors that were identified as playing a significant role in SME adoption of cloud services: rela-tive advantage, uncertainty, geo-restriction, compatibility, size, top management support, prior experience, innovativeness, industry, market scope, supplier efforts and external computing support. [S65] empirically examined main drivers and inhibiting factors of SaaS-adoption for different application types.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Finally, 12 studies discussed case studies to illustrate the migration process.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The [S11] summarized potential benefits and risks to migrate traditional appli-cations to the cloud using CloudFTP on Windows Azure along with the auto-scaling feature. [S18] discussed the motivation, requirements, feasibility of migrating CiteSeerX digital library to provide an IaaS model in a private cloud.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	[S18] discussed the motivation, requirements, feasibility of migrating CiteSeerX digital library to provide an IaaS model in a private cloud.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	[S45] abstracts from current market prices and investigates the interaction of cloud provider and clients from an analytical perspective.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	[S45] abstracts from current market prices and investigates the interaction of cloud provider and clients from an analytical perspective. A general understanding of how providers and clients potentially benefit finan-cially from Infrastructure-as-a-Service (IaaS) can help clients to appraise price uncertainty in strategic resource planning decisions.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	[S66] examine CC adoption preparation and reasons for non adoption among Small and Medium Enterprises (SMEs) in Ireland.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	This subsection discusses how selected papers addressed RQ2: Which factors are considered by companies to assess the cost-benefit relationship of adoption and migration to the cloud computing? During the analysis of RQ2, we identified a myriad of factors related to the cost-benefit relationship of cloud computing adoption.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	During the analysis of RQ2, we identified a myriad of factors related to the cost-benefit relationship of cloud computing adoption.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	During the analysis of RQ2, we identified a myriad of factors related to the cost-benefit relationship of cloud computing adoption.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	In [S3], the authors argue that CC has been viewed mainly from the cost perspective. The paper proposed a model that helps not just identify the suitability of a company for the cloud by clearly spelling out all the factors that need to be considered for the same, but also gives a certain profitability valuation of the benefits associated with CC. An approach to detect performance anti-patterns before migrating to CC based on static analysis was presented in [S12]. In [S4], the architectural features of CC are explored and classified according to the requirements of end-users, enterprises, and cloud providers themselves to support the cloud adoption.	Ivon Miranda Santos

dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	The paper proposed a model that helps not just identify the suitability of a company for the cloud by clearly spelling out all the factors that need to be considered for the same, but also gives a certain profitability valuation of the benefits associated with CC. An approach to detect performance anti-patterns before migrating to CC based on static analysis was presented in [S12]. In [S4], the architectural features of CC are explored and classified according to the requirements of end-users, enterprises, and cloud providers themselves to support the cloud adoption.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	S36] proposed the use of a real option model to help companies think and decide when to switch to cloud based on the expected benefits, uncertainties and the value a company puts on money. [S37] investigated different approaches to reduce both cost and task completion time of computations using Amazon EC2's spot instances for resource provisioning.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	S36] proposed the use of a real option model to help companies think and decide when to switch to cloud based on the expected benefits, uncertainties and the value a company puts on money. [S37] investigated different approaches to reduce both cost and task completion time of computations using Amazon EC2's spot instances for resource provisioning.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	S36] proposed the use of a real option model to help companies think and decide when to switch to cloud based on the expected benefits, uncertainties and the value a company puts on money. [S37] investigated different approaches to reduce both cost and task completion time of computations using Amazon EC2's spot instances for resource provisioning.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in risk and security	S36] proposed the use of a real option model to help companies think and decide when to switch to cloud based on the expected benefits, uncertainties and the value a company puts on money. [S37] investigated different approaches to reduce both cost and task completion time of computations using Amazon EC2's spot instances for resource provisioning.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Deployment is defined in terms of the strategic, economic, and technological benefits realized through cloud computing, which can set the organization apart from its competitors.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	[S55] the tool CloudCmp to systematically compare the performance and cost of cloud providers along dimensions that matter to customers. This sys-tematic review provided evidences of strategies used by companies to identify opportunities to migrate and adopt cloud computing, how they assess the cost-benefit relationship and strategies behind the rationale to select providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	[S55] the tool CloudCmp to systematically compare the performance and cost of cloud providers along dimensions that matter to customers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	[S55] the tool CloudCmp to systematically compare the performance and cost of cloud providers along dimensions that matter to customers. This sys-tematic review provided evidences of strategies used by companies to identify opportunities to migrate and adopt cloud computing, how they assess the cost-benefit relationship and strategies behind the rationale to select providers. A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e.,	Ivon Miranda Santos

dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	This sys-tematic review provided evidences of strategies used by companies to identify opportunities to migrate and adopt cloud computing, how they assess the cost-benefit relationship and strategies behind the rationale to select providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	This sys-tematic review provided evidences of strategies used by companies to identify opportunities to migrate and adopt cloud computing, how they assess the cost-benefit relationship and strategies behind the rationale to select providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e.,	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e.,	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e., security and trustworthiness, elasticity, portability and inter-operability, and cloud resilience. In addition, many studies look into reference architectures and cloud-based architecture design methods as well.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e., security and trustworthiness, elasticity, portability and inter-operability, and cloud resilience. In addition, many studies look into reference architectures and cloud-based architecture design methods as well.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in risk and security	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e.,	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e., security and trustworthiness, elasticity, portability and inter-operability, and cloud resilience. In addition, many studies look into reference architectures and cloud-based architecture design methods as well.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Flexibility	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e., security and trustworthiness, elasticity, portability and inter-operability, and cloud resilience. In addition, many studies look into reference architectures and cloud-based architecture design methods as well.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Elasticity	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e., security and trustworthiness, elasticity, portability and inter-operability, and cloud resilience. In addition, many studies look into reference architectures and cloud-based architecture design methods as well.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Resilience	A spectrum of techniques and approaches has been identified that cope with vari-ous concerns, i.e., security and trustworthiness, elasticity, portability and inter-operability, and cloud resilience. In addition, many studies look into reference architectures and cloud-based architecture design methods as well.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	4, it is possible to conclude about the importance of the process to select the strategy to be adopted by a company (RQ1), the cost-benefit relation-ship (RQ2) and in the selection of providers (RQ3).	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	In this Systematic Literature Review (SLR), we selected evidences from the literature to describe, characterize and highlight differences and commonali-ties among strategies adopted by companies to decide for the migration to the cloud. In this scenario, we also focused in the identification of evidences related to the cost-benefit relationship of this migration and selection of cloud service providers. Our goal was to systematically analyze data from the selected papers to draw a clear picture from what has been registered in the literature regarding how companies decide towards cloud computing.	Ivon Miranda Santos

dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	In this scenario, we also focused in the identification of evidences related to the cost-benefit relationship of this migration and selection of cloud service providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud migration benefit	In this scenario, we also focused in the identification of evidences related to the cost-benefit relationship of this migration and selection of cloud service providers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	One of the main contribution of this paper was also the discussion of a list of approaches published in the lit-erature that deal with the cost-benefit relationship and the rationale behind the selection of providers and their respective services.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	One of the main contribution of this paper was also the discussion of a list of approaches published in the lit-erature that deal with the cost-benefit relationship and the rationale behind the selection of providers and their respective services. We are already investigating how providers have perceived the clients adoption and migration to the cloud computing paradigm and how they tailor their strategies to meet the needs of customers.	Ivon Miranda Santos
dePaula2016-A_systematic_literature_review_on_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	One of the main contribution of this paper was also the discussion of a list of approaches published in the lit-erature that deal with the cost-benefit relationship and the rationale behind the selection of providers and their respective services. We are already investigating how providers have perceived the clients adoption and migration to the cloud computing paradigm and how they tailor their strategies to meet the needs of customers.	Ivon Miranda Santos
Elgedawy2015-Sultan_A_composite_data_consistency_approach_for_s	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	I. INTRODUCTION Moving business services to global clouds as SaaS services has many benefits (such as flexibility, scalability, reducing capital expenditure on capacity investment), however many businesses are still reluctant to do the move due to its high business risks such as "cloud-vendor lock-in". The cloud-vendor lock-in risk makes businesses vulnerable to price increase and/or changes to the cloud-vendor services.	Ivon Miranda Santos
Elgedawy2015-Sultan_A_composite_data_consistency_approach_for_s	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Moving business services to global clouds as SaaS services has many benefits (such as flexibility, scalability, reducing capital expenditure on capacity investment), however many businesses are still reluctant to do the move due to its high business risks such as "cloud-vendor lock-in". The cloud-vendor lock-in risk makes businesses vulnerable to price increase and/or changes to the cloud-vendor services.	Ivon Miranda Santos
Elmroth2011-Self-management_challenges_for_multi-cloud_architec	MULTI-CLOUD BENEFITS > multi-cloud benefit	Recent advantages in virtualization combined with multi-tenancy enables cloud infrastructure providers to perform large-scale provisioning of compute or data intensive services.	Ivon Miranda Santos
Fowley2018-Cloud_migration_architecture_and_pricing_–_Mapping_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Being able to scale up or down application infrastructure to meet quality requirements and enable reliable consumption of a product is a key benefit. Cloud migration research has stud-ied the cloud on-boarding in quite some detail [13].	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud management	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go).	Ivon Miranda Santos

Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go).	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go). Although trivial migration projects may be manageable in an ad-hoc manner, a methodological approach becomes important when there is a plan to move large-scale and complex legacy applications that support core business processes of an organisation.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go). Although trivial migration projects may be manageable in an ad-hoc manner, a methodological approach becomes important when there is a plan to move large-scale and complex legacy applications that support core business processes of an organisation.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go). Although trivial migration projects may be manageable in an ad-hoc manner, a methodological approach becomes important when there is a plan to move large-scale and complex legacy applications that support core business processes of an organisation.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey__evaluation_framew	MULTI-CLOUD BENEFITS > Optimizing cost management	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go). Although trivial migration projects may be manageable in an ad-hoc manner, a methodological approach becomes important when there is a plan to move large-scale and complex legacy applications that support core business processes of an organisation.	Ivon Miranda Santos

Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > Scalability	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go). Although trivial migration projects may be manageable in an ad-hoc manner, a methodological approach becomes important when there is a plan to move large-scale and complex legacy applications that support core business processes of an organisation.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud native architecture	Such requirements raise new challenges to the migration of applications to the cloud and hence needs improving conventional software development methodologies to address these specific requirements. Various projects and studies in cloud computing community define migration approaches in order to enable legacy applications to take benefit from cloud services (e.g. reducing maintenance costs, economies of scale, and pay-as-you-go).	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Incorporating Agile practice such as light process, short release, and continuous testing into cloud migration approaches have also received attention from the cloud community. In the approach proposed by Krasteva and Stavru [S1], authors pose whether legacy modernisation processes can benefit from Agile methodologies.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	)	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Ahmad and Babar in their proposed framework [S21] stress two concerns during conducting context analysis, i.e. (i) determine the type of the application is to be migrated to the cloud since some applications may not benefit from the cloud such as safety-critical or embedded applications, (ii) effort and cost that required for the migration regarding perceived benefits. Table XX summarises the identified concerns from 43 reviewed approaches that should be taken into account when conducting context analysis.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > Benefits in cloud management	(i) determine the type of the application is to be migrated to the cloud since some applications may not benefit from the cloud such as safety-critical or embedded applications, (ii) effort and cost that required for the migration regarding perceived benefits.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > cloud migration benefit	(i) determine the type of the application is to be migrated to the cloud since some applications may not benefit from the cloud such as safety-critical or embedded applications, (ii) effort and cost that required for the migration regarding perceived benefits.	Ivon Miranda Santos
Gholami2016-Cloud_migration_process—a_survey_evaluation_framew	MULTI-CLOUD BENEFITS > cloud migration benefit	With many advantages that variety of cloud migration approaches offers, nevertheless, it would be beneficial to have an overarching view of legacy to cloud migration process. Furthermore, we observed that the approaches are often combined with technical-centric concepts which are often not homogenous and sometimes limited to certain cloud-specific platforms	Ivon Miranda Santos
Gourisaria2020-An_Extensive_Review_on_Cloud_Computing	MULTI-CLOUD BENEFITS > cloud computing benefit	This paper is an extensive survey intended to highlighting the importance of cloud computing in the business world and how it has benefited major companies as well as the potential ones.	Ivon Miranda Santos
Gourisaria2020-An_Extensive_Review_on_Cloud_Computing	MULTI-CLOUD BENEFITS > cloud computing benefit	The advantages of public cloud are inexpensive setup, scalability, seamless uptime and no wastage of resources. The principal concerns pertaining to public cloud are security threats.	Ivon Miranda Santos

Gourisaria2020-An_Extensive_Review_on_Cloud_Computing	MULTI-CLOUD BENEFITS > cloud computing benefit	Advantages of using cloud database are economic, improved performance and efficiency, software updates, improved document compatibility, improved group collaboration and high storage.	Ivon Miranda Santos
Gourisaria2020-An_Extensive_Review_on_Cloud_Computing	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	7.1 The Hypervisor	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. We make several contributions.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. We make several contributions.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. We make several contributions.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. We make several contributions.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Optimizing cost management	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. We make several contributions.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. W	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Legal restrictions / Data jurisdiction restrictions	In this paper, we tackle challenges in migrating enterprise services into hybrid cloud-based deployments, where enterprise operations are partly hosted on-premise and partly in the cloud. Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud. We make several contributions.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Such hy-brid architectures enable enterprises to benefit from cloud-based ar-chitectures, while honoring application performance requirements, and privacy restrictions on what services may be migrated to the cloud.	Ivon Miranda Santos

Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	Our model takes into account enterprise-specific constraints, cost savings, and increased transaction delays and wide-area communication costs that may re-sult from the migration.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > cloud computing benefit	The advantages and initial success stories of cloud computing are prompting many enterprise networks to explore how the cloud could be leveraged to deliver their existing enterprise applications. Consider a recent survey of 1,780 data center managers in 26 coun-tries worldwide conducted by Symantec [25]. Over 36% of respon-dents indicated that the large number of applications and complex-ity of managing data centers were huge problems that they faced. Over 82% of respondents indicated that reducing data center costs was one of the most important objectives for coming years. Over 72% of respondents indicated they were considering or using pub-lic cloud computing, although 94% of these respondents were still in the discussion, planning, trial or implementation stages.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	InternetCosts(M) is the increased communication costs since traf-fic between the data center and the cloud is now sent over the In-ternet, and DelayIncrease(M) is the increase in transaction de-lay.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	3.5 Modeling benefits of migration There are several factors that can enable enterprises to reduce their costs as they migrate to the cloud.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	While we assume the benefits for migrating all servers in a class is the same, the model could be eas-ily extended to consider heterogeneity in benefits across servers in each class, which may arise for instance due to the the age of the hardware already in place in the enterprise. Estimating the benefits per server, Bc and Bs, is in general non-trivial, and is potentially dependent on the particular enterprise and choice of cloud provider. An infrastructure-as-a-service of-fering like EC2 [1], for instance, might not obviate the need for database adminstrators unlike a platform-as-a-service offering such as Azure [8].	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	Modeling migration benefits and communication costs:	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	We as-sume that migrating servers to the cloud can reduce costs by a factor of 7 for compute-class servers, and 5 for storage-class servers, as suggested in [14].	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud management	Finally, we used the same val-ues for migration benefits and communication costs as in §5.1.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > cloud computing benefit	Many challenges must be addressed before enterprises can embrace the benefits of cloud computing.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in risk and security	Maintaining the security and privacy of data once migrated to the cloud is a challenge [14, 28], and has started receiving attention from the community [19].	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	In this paper, we have made two contributions. First, we have shown (i) the potential benefits of hybrid cloud deployments of en-terprise applications compared to "all or nothing" migrations; and (ii) the importance and feasibility of a planned approach to making migration decisions. Second, we have shown the feasibility of au-tomatic and assurable reconfiguration of reachability policies as en-terprise applications are migrated to hybrid cloud models.	Ivon Miranda Santos

Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	In this paper, we have made two contributions. First, we have shown (i) the potential benefits of hybrid cloud deployments of en-terprise applications compared to "all or nothing" migrations; and (ii) the importance and feasibility of a planned approach to making migration decisions. Second, we have shown the feasibility of au-tomatic and assurable reconfiguration of reachability policies as en-terprise applications are migrated to hybrid cloud models.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	In this paper, we have made two contributions. First, we have shown (i) the potential benefits of hybrid cloud deployments of en-terprise applications compared to "all or nothing" migrations; and (ii) the importance and feasibility of a planned approach to making migration decisions. Second, we have shown the feasibility of au-tomatic and assurable reconfiguration of reachability policies as en-terprise applications are migrated to hybrid cloud models.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	In this paper, we have made two contributions. First, we have shown (i) the potential benefits of hybrid cloud deployments of en-terprise applications compared to "all or nothing" migrations; and (ii) the importance and feasibility of a planned approach to making migration decisions. Second, we have shown the feasibility of au-tomatic and assurable reconfiguration of reachability policies as en-terprise applications are migrated to hybrid cloud models.	Ivon Miranda Santos
Hajjat2010-Cloudward_bound_Planning_for_beneficial_migration_of	MULTI-CLOUD BENEFITS > cloud migration benefit	First, we have shown (i) the potential benefits of hybrid cloud deployments of en-terprise applications compared to "all or nothing" migrations; and (ii) the importance and feasibility of a planned approach to making migration decisions.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Monolithic applications have been the prevailing archi-tecture for enterprise applications after the emergence of frameworks like J2EE around 2000.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud native architecture	Monolithic applications have been the prevailing archi-tecture for enterprise applications after the emergence of frameworks like J2EE around 2000.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud management	Both microservices architecture and multi-tenancy offer additional benefits to the end-users of the application and the developers.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Both microservices architecture and multi-tenancy offer additional benefits to the end-users of the application and the developers.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > cloud computing benefit	Both microservices architecture and multi-tenancy offer additional benefits to the end-users of the application and the developers.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud management	Migrating to microservices architecture (MSA) is the right way forward for legacy systems to be modernized [3], [4]. There are huge benefits for migrating to MSA such as maintainability and scalability in the long run [5], e.g., by adopting DevOps and benefiting from Cloud-native elasticity [6]. Microservices can be packaged and deployed in isolation from the main product, which is an important requirement for multi-tenant context.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Migrating to microservices architecture (MSA) is the right way forward for legacy systems to be modernized [3], [4]. There are huge benefits for migrating to MSA such as maintainability and scalability in the long run [5], e.g., by adopting DevOps and benefiting from Cloud-native elasticity [6].	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	There are huge benefits for migrating to MSA such as maintainability and scalability in the long run [5], e.g., by adopting DevOps and benefiting from Cloud-native elasticity [6]. Microservices can be packaged and deployed in isolation from the main product, which is an important requirement for multi-tenant context.	Ivon Miranda Santos

Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	There are huge benefits for migrating to MSA such as maintainability and scalability in the long run [5], e.g., by adopting DevOps and benefiting from Cloud-native elasticity [6]. Microservices can be packaged and deployed in isolation from the main product, which is an important requirement for multi-tenant context.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Maintainability	There are huge benefits for migrating to MSA such as maintainability and scalability in the long run [5], e.g., by adopting DevOps and benefiting from Cloud-native elasticity [6]. Microservices can be packaged and deployed in isolation from the main product, which is an important requirement for multi-tenant context.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Multi-tenant	There are huge benefits for migrating to MSA such as maintainability and scalability in the long run [5], e.g., by adopting DevOps and benefiting from Cloud-native elasticity [6]. Microservices can be packaged and deployed in isolation from the main product, which is an important requirement for multi-tenant context.	Ivon Miranda Santos
Haugeland2021-Migrating_monoliths_to_microservices-based_custom	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	One of the main benefits of the microservice architecture is the decoupled nature of the individual services.	Ivon Miranda Santos
Hwang2015-Computing_resource_transformation__consolidation_and_	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Hajjat et al. [2] analyze the potential benefits of hybrid cloud deployments of enterprise applications, and the importance and feasibility of a planned approach to making migration decisions. Also, authors have shown the feasibility of automatic and assurable reconfiguration of reachability policies as enterprise applications are migrated to hybrid cloud models.	Ivon Miranda Santos
Hwang2015-Computing_resource_transformation__consolidation_and_	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Hajjat et al. [2] analyze the potential benefits of hybrid cloud deployments of enterprise applications, and the importance and feasibility of a planned approach to making migration decisions. Also, authors have shown the feasibility of automatic and assurable reconfiguration of reachability policies as enterprise applications are migrated to hybrid cloud models. Zhang et al. [26] propose an analytics to automatically detect software misconfigurations before the migration. Bai et al. [15] propose an analytical model that can discover the complex server-to-server and application-to-server relationships. We complement these works to extend the resource planning, server consolidation, and server decomposition as a part of the migration analytics.	Ivon Miranda Santos
Hwang2015-Computing_resource_transformation__consolidation_and_	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	Hajjat et al. [2] analyze the potential benefits of hybrid cloud deployments of enterprise applications, and the importance and feasibility of a planned approach to making migration decisions. Also, authors have shown the feasibility of automatic and assurable reconfiguration of reachability policies as enterprise applications are migrated to hybrid cloud models. Zhang et al. [26] propose an analytics to automatically detect software misconfigurations before the migration. Bai et al. [15] propose an analytical model that can discover the complex server-to-server and application-to-server relationships. We complement these works to extend the resource planning, server consolidation, and server decomposition as a part of the migration analytics.	Ivon Miranda Santos

Hwang2015-Computing_resource_transformation__consolidation_and_	MULTI-CLOUD BENEFITS > Avoid vendor lock-in	Hajjat et al. [2] analyze the potential benefits of hybrid cloud deployments of enterprise applications, and the importance and feasibility of a planned approach to making migration decisions. Also, authors have shown the feasibility of automatic and assurable reconfiguration of reachability policies as enterprise applications are migrated to hybrid cloud models. Zhang et al. [26] propose an analytics to automatically detect software misconfigurations before the migration. Bai et al. [15] propose an analytical model that can discover the complex server-to-server and application-to-server relationships. We complement these works to extend the resource planning, server consolidation, and server decomposition as a part of the migration analytics.	Ivon Miranda Santos
Jambunathan2018-Architecture_decision_on_using_microservices_or	MULTI-CLOUD BENEFITS > cloud computing benefit	Although there are some advantages, it also has few drawbacks like any other technology such as, ⬜ Vendor control, multitenancy problems, vendor lock-in, and security concerns are some of the problems due to the use of third-party APIs. ⬜ Developers are dependent on vendors for debugging and monitoring tools. ⬜ Architecture complexity - It gets cumbersome to manage too many functions, and ignoring granularity will end up creating mini-monoliths. ⬜ Integration testing serverless apps is tough. The units of integration with Serverless (Functions) are a lot smaller than with other architectures and therefore we rely on integration testing a lot more than we may do with other architectural styles.	Ivon Miranda Santos
Jambunathan2018-Architecture_decision_on_using_microservices_or	MULTI-CLOUD BENEFITS > Benefits in cloud management	As microservices enable smaller, faster releases, they allow new features to be released to only a subset of users initially, and then to the entire user base once the feature meets quality expectations.	Ivon Miranda Santos
Jambunathan2018-Architecture_decision_on_using_microservices_or	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	As microservices enable smaller, faster releases, they allow new features to be released to only a subset of users initially, and then to the entire user base once the feature meets quality expectations.	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Larger enterprises are trying to exploit the benefits of this platform [4] by taking business continuity strategies into account [1]. For the former category, the attraction comes from the costing flexibility favoring pay-per-use models rather than upfront purchase of an overprovisioned infrastructure.	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	However, in the recent version in 2013, in a departure from previous research, cost saving for the first time becomes the primary reason for cloud adoption.	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	4), adding more instances of applications will only influence if the application is engineered for load balancing between the resources. This capability rarely holds for type III while the other types of migration can benefit from this scalability. For a more detailed association of adaptations and cross-cutting concerns to each type refer to [3].	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Decision making for cloud adoption [S1] [S3] [S4] [S5] [S10] [S11] [S12] [S14] [S16] [S18] [S20] [S21] [S22] [S23] is	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud management	inherently complex and influenced by multiple factors such as cost and benefits through migration [33].	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	We first discuss the maturity level of research in Section 6.1, after which we summarize research progress and principle findings to highlight trends and possible future research. Finally, we look at the key benefits of this study for researchers and practitioners in cloud migration in Section 6.3. 6.1 Maturity of Cloud Migration Research	Ivon Miranda Santos

Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	In addition, more research results on cloud migration evalua-tion with real-world case studies and experience reports are needed. More case studies will result in more confidence of researchers and practitioners regarding the benefits of cloud migration and the validity of research. One dimension that is a future direction for cloud migration studies is the importance of open accessible results specifically for migration decision support research.	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	The characterization framework (Section 4) provides a holistic view of different migration aspects to be considered in the context of the migration process.	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	8 CONCLUSIONS The objective of this study was to consolidate existing research on legacy software migration to the cloud regard-ing the claimed benefits and the provided evidence of migration. The main contribution of this study is a characterization framework for cloud migration and a comparison of systematically selected studies through the framework to point out existing research gaps.	Ivon Miranda Santos
Jamshidi2013-Cloud_migration_research_A_systematic_review	MULTI-CLOUD BENEFITS > cloud migration benefit	The objective of this study was to consolidate existing research on legacy software migration to the cloud regard-ing the claimed benefits and the provided evidence of migration.	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	1 Introduction Cloud migration [1] benefits from the cloud promise of converting capital expenditure to operational cost [2]. Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems [3] on-premise still support core business services.	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Cloud migration [1] benefits from the cloud promise of converting capital expenditure to operational cost [2]. Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems [3] on-premise still support core business services.	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > cloud migration benefit	Cloud migration [1] benefits from the cloud promise of converting capital expenditure to operational cost [2].	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems [3] on-premise still support core business services.	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The selected patterns can be integrated based on the presence/absence of overlaps between patterns.	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	They would benefit from the cloud-based increased responsiveness during peak times. A second objective is to expand ways to access applications. Applications located in the public cloud are available over the Internet, but authentication concerns exist. A third goal is portability, i.e., it can be moved between a cloud and a private data	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	They would benefit from the cloud-based increased responsiveness during peak times. A second objective is to expand ways to access applications. Applications located in the public cloud are available over the Internet, but authentication concerns exist. A third goal is portability, i.e., it can be moved between a cloud and a private data	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	They would benefit from the cloud-based increased responsiveness during peak times. A second objective is to expand ways to access applications. Applications located in the public cloud are available over the Internet, but authentication concerns exist. A third goal is portability, i.e., it can be moved between a cloud and a private data	Ivon Miranda Santos

Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Data mangement and privacy	They would benefit from the cloud-based increased responsiveness during peak times. A second objective is to expand ways to access applications. Applications located in the public cloud are available over the Internet, but authentication concerns exist. A third goal is portability, i.e., it can be moved between a cloud and a private data	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Hight availability	They would benefit from the cloud-based increased responsiveness during peak times. A second objective is to expand ways to access applications. Applications located in the public cloud are available over the Internet, but authentication concerns exist. A third goal is portability, i.e., it can be moved between a cloud and a private data	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Cost efficient	They would benefit from the cloud-based increased responsiveness during peak times. A second objective is to expand ways to access applications. Applications located in the public cloud are available over the Internet, but authentication concerns exist. A third goal is portability, i.e., it can be moved between a cloud and a private data	Ivon Miranda Santos
Jamshidi2015-Cloud_migration_patterns_A_multi-cloud_service_arc	MULTI-CLOUD BENEFITS > Benefits in cloud management	, [14]) is inherently complex and influenced by multiple factors such as cost and benefits through migration [15].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	INTRODUCTION The migration of V-PAM software applications to the cloud [1] enables to benefit from the cloud promise of converting capital expenditure to operational cost [2]. Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > cloud migration benefit	The migration of V-PAM software applications to the cloud [1] enables to benefit from the cloud promise of converting capital expenditure to operational cost [2].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Data mangement and privacy	Mixing cloud architecture with private data centers adds operational efficiency for workload bursts while legacy systems on-premise still support core business services [3].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Such a deployment model is essential in cases where critical data needs to be kept in-house in corporate data cen-ters. Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials. In a multi-cloud configuration perspective, parts of the application can be deployed on PaaS, IaaS or both [15, 24], see Figure 4 for an example.	Ivon Miranda Santos

Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Such a deployment model is essential in cases where critical data needs to be kept in-house in corporate data cen-ters. Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Such a deployment model is essential in cases where critical data needs to be kept in-house in corporate data cen-ters. Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials.\nIn a multi-cloud configuration perspective, parts of the application can be deployed on PaaS, IaaS or both [15, 24], see Figure 4 for an example.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Such a deployment model is essential in cases where critical data needs to be kept in-house in corporate data cen-ters. Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Such a deployment model is essential in cases where critical data needs to be kept in-house in corporate data cen-ters. Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	Such a deployment model is essential in cases where critical data needs to be kept in-house in corporate data cen-ters. Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > multi-cloud benefit	Different application types and requirements may benefit from and even demand a multi-cloud deployment – see [23] for supplementary materials.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > cloud migration benefit	The current architecture is mirrored in the cloud, but can take advantage of vir-tualization to not only reduce operational expenditure, but also to create multiple instances of the application to improve scalability and failover without increasing capital expenditure.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The selected patterns can be integrated based on the presence/absence of overlaps between patterns.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud management	Here a structured, systematic approach proved to be a valuable solution that has helped to deliver cloud solutions that meet the expectations and to keep the projects on track and avoid unnecessary delays.\nA common problem during migration is the need to refactor the architecture if the aim is to fully benefit from cloud performance and flexibility promises. For instance, the storage refactor-ing options relating to relational, table and blob storage, that we investigated and documented in [30], are particularly addressed by patterns MP1 and MP3.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Here a structured, systematic approach proved to be a valuable solution that has helped to deliver cloud solutions that meet the expectations and to keep the projects on track and avoid unnecessary delays.\nA common problem during migration is the need to refactor the architecture if the aim is to fully benefit from cloud performance and flexibility promises. For instance, the storage refactor-ing options relating to relational, table and blob storage, that we investigated and documented in [30], are particularly addressed by patterns MP1 and MP3.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Decision making for cloud adoption (e.g.,	Ivon Miranda Santos

Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud management	, [17, 21, 36, 37]) is inher-ently complex and influenced by multiple factors, such as cost and benefits through migration [38].	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Architecture-oriented patterns for multi-cloud settings are important for two reasons. Firstly, architectures are often refactored to adapt an application to the cloud platform, to benefit more from cloud characteristics such as elasticity or simply to modernize a legacy application. Secondly, appli-cations often need to be integrated with other components as part of a larger business process in Copyright © 2016 John Wiley & Sons, Ltd. Softw. Pract. Exper. 2017; 47:1159–1184 DOI: 10.1002/spe 1097024x, 2017, 9, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/spe.2442 by UNB - Universidade de Brasilia, Wiley Online Library on [07/01/2023]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License1182 P. JAMSHIDI, C. PAHL AND N. C. MENDONÇA often multi-cloud environments.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Architecture-oriented patterns for multi-cloud settings are important for two reasons. Firstly, architectures are often refactored to adapt an application to the cloud platform, to benefit more from cloud characteristics such as elasticity or simply to modernize a legacy application.	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Architecture-oriented patterns for multi-cloud settings are important for two reasons. Firstly, architectures are often refactored to adapt an application to the cloud platform, to benefit more from cloud characteristics such as elasticity or simply to modernize a legacy application. Secondly, appli-cations often need to be integrated with other components as part of a larger business process in	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Architecture-oriented patterns for multi-cloud settings are important for two reasons. Firstly, architectures are often refactored to adapt an application to the cloud platform, to benefit more from cloud characteristics such as elasticity or simply to modernize a legacy application. Secondly, appli-cations often need to be integrated with other components as part of a larger business process in	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Elasticity	Architecture-oriented patterns for multi-cloud settings are important for two reasons. Firstly, architectures are often refactored to adapt an application to the cloud platform, to benefit more from cloud characteristics such as elasticity or simply to modernize a legacy application. Secondly, appli-cations often need to be integrated with other components as part of a larger business process in	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Maintainability	Architecture-oriented patterns for multi-cloud settings are important for two reasons. Firstly, architectures are often refactored to adapt an application to the cloud platform, to benefit more from cloud characteristics such as elasticity or simply to modernize a legacy application. Secondly, appli-cations often need to be integrated with other components as part of a larger business process in	Ivon Miranda Santos
Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Our implicit assumptions here included the possibility to compo-nentise legacy applications and also to target a cloud native architecture. Our brief discussion of microservices as a recently emerging cloud native architectural style demonstrates the importance of servitisation, but also the need to provide a framework that is generic enough to support the different service flavors in the context of DevOps.	Ivon Miranda Santos

Jamshidi2017-Pattern-based_multicloud_architecture_migration	MULTI-CLOUD BENEFITS > DevOps	Our implicit assumptions here included the possibility to compo-nentise legacy applications and also to target a cloud native architecture. Our brief discussion of microservices as a recently emerging cloud native architectural style demonstrates the importance of servitisation, but also the need to provide a framework that is generic enough to support the different service flavors in the context of DevOps.	Ivon Miranda Santos
Kratzke2017-Understanding_cloud-native_applications_after_10_ye	MULTI-CLOUD BENEFITS > cloud computing benefit	According to Stine (Stine, 2015) there are common motivations for cloud-native appli-cation architectures like to deliver software-based solutions more quickly (speed), in a more fault isolating, fault tolerating, and au-tomatic recovering way (safety), to enable horizontal (instead of vertical) application scaling (scale), and finally to handle a huge di-versity of (mobile) platforms and legacy systems (client diversity).	Ivon Miranda Santos
Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The next section summarizes the techniques and methods adopted by researchers to compose services in a traditional single-cloud environment. Then, the benefits and the taxonomy of multicloud approach are presented in Section 5.	Ivon Miranda Santos
Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > multi-cloud benefit	Then, the benefits and the taxonomy of multicloud approach are presented in Section 5.	Ivon Miranda Santos
Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > multi-cloud benefit	From the above few discussed approaches, it is clear that MCSC is a recent and emerging topic. Each of the existing solutions has its own advantages and drawbacks. In this section, we compare the discussed approaches based on the following criteria: • Goal: specifies the main objectives of the approach (eg, reducing the number of clouds, ensuring the privacy of services composition, and decreasing information leakage). • Composition criteria: indicates the criteria that must be satisfied during the composition of services or process fragments. • Service model: denotes the type of composed services in the approach (eg, Web service, process fragment, and mashup). • Composition unit: indicates whether the authors used simple services in the composition or they reused existing process fragments. • Used technique: presents the technique used for the composition (eg, particle swarm optimization, FCA, ACO, clustering, and MapReduce). • Context: indicates whether the composition is realized in a multicloud environment, a cross-cloud environment, an intercloud, etc. • Dimension: indicates whether the service composition is realized in a vertical or horizontal dimension. • Modality: determines whether the service composition is realized in a 1-time or persistent manner	Ivon Miranda Santos

Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	The organization requirements are becoming more complex, and the rapid development of the cloud computing engenders a rise in the services number onto the cloud environment. Despite the huge number of cloud service composition approaches, service composition from 1 single cloud limits the benefits of other clouds in responding to the user requirements. Therefore, the recent approaches tend to select services from several clouds, such as intercloud in Zhang et al56 and crosscloud in Dou et al53 (see Figure 9). For most researchers, the main objective behind composing services in a multicloud environment was ensuring a high QoS, reliability, flexibility, etc. Despite the advantages of the multicloud environment, we could remark from the above related works that most of the approaches that reuse process fragments are not proposed for reusing SPFs from the cloud environment, such as Yang et al58 and Zemni et al.59,60 Only 1 approach proposed in Nacer et al19 considers reusing fragments from the existing business processes in the multicloud environment.	Ivon Miranda Santos
Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Therefore, the recent approaches tend to select services from several clouds, such as intercloud in Zhang et al56 and crosscloud in Dou et al53 (see Figure 9).	Ivon Miranda Santos
Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > multi-cloud benefit	Despite the advantages of the multicloud environment, we could remark from the above related works that most of the approaches that reuse process fragments are not proposed for reusing SPFs from the cloud environment, such as Yang et al58 and Zemni et al.59,60 Only 1 approach proposed in Nacer et al19 considers reusing fragments from the existing business processes in the multicloud environment.	Ivon Miranda Santos
Lahmar2018-Multicloud_service_composition_A_survey_of_current_a	MULTI-CLOUD BENEFITS > multi-cloud benefit	The advantages of using services from multiple clouds and the heterogeneity of the QoS requirements are the reasons behind investigating the SLA in a multicloud environment, in order to maximize the user's profit. SLA interoperability and issues have been addressed in the intercloud. In such environment, the obtained SLAs are provider independent.89 Some of the SLA issues are discussed in the following works. Jrad et al80 proposed an approach called hybrid utility–based genetic algorithm in order to select the appropriate services necessary for the computation and the storage according to their QoS and the cost. To guarantee an efficient selection, a semantic description of the providers require-ments and offers is used. This description is realized using ontology in order to deal with the problem of matching several services from multiple clouds, as it is the case in the DNA workflow.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Cloud-native is the predominant paradigm for building web-based applications today [1].	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Many new applications are built as a cloud-native application (CNA) right from the start, but there is also a need to migrate existing applications to a CNA style in order to benefit from the advantages of CNAs.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	But there is still a lack of structured and broadly applicable approaches to facilitate the migration process.	Ivon Miranda Santos

Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	– Which information at which level of abstraction is needed for a model-driven cloud-native migration approach? – Which aspects need to be included in the model-driven approach to fully benefit from the cloud-native paradigm?	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	2.2 Cloud migration With ongoing innovation and the availability of new tech-nologies, the migration of existing applications is always an important topic to benefit from these innovations and remain competitive. Migration to the cloud has been con-sidered as a research topic since the emergence of the first cloud platforms.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	One possibility would be to move an existing application, deployed in an on-premise environ-ment, to a virtual machine of an IaaS offering (Migrate the whole application stack [11]).	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > cloud computing benefit	While this would relieve the application developers from managing infrastructure, further benefits provided by cloud computing are not obtained.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Components are the basic elements of the modeling approach which can be compute or storage components. This differentiation is important, because storage components are inherently state-ful and can not directly benefit from the elasticity of a cloud environment. This is in line with Levcovitz et al.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Components are the basic elements of the modeling approach which can be compute or storage components. This differentiation is important, because storage components are inherently state-ful and can not directly benefit from the elasticity of a cloud environment. This is in line with Levcovitz et al.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > cloud migration benefit	Components are the basic elements of the modeling approach which can be compute or storage components. This differentiation is important, because storage components are inherently state-ful and can not directly benefit from the elasticity of a cloud environment. This is in line with Levcovitz et al.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Elasticity	Components are the basic elements of the modeling approach which can be compute or storage components. This differentiation is important, because storage components are inherently state-ful and can not directly benefit from the elasticity of a cloud environment. This is in line with Levcovitz et al.	Ivon Miranda Santos
Lichtenthaler2019-Requirements_for_a_model-driven_cloud-native_	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	The requirements and the overview for the proposed approach are the contributions of this paper.	Ivon Miranda Santos
Maniah2022-A_systematic_literature_review_Risk_analysis_in_clou	MULTI-CLOUD BENEFITS > cloud computing benefit	The benefits of using cloud computing technology to the possi-ble risks that arise from this technology are described in detail in section 1.	Ivon Miranda Santos
Maniah2022-A_systematic_literature_review_Risk_analysis_in_clou	MULTI-CLOUD BENEFITS > cloud computing benefit	The use of cloud computing technology services provides many advantages in supporting the company's business. The advantages of cloud services include: unlimited storage, provision-ing and updating, guaranteed privacy more secure (Ko et al., 2011).	Ivon Miranda Santos
Maniah2022-A_systematic_literature_review_Risk_analysis_in_clou	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	, 2019).	Ivon Miranda Santos
Maniah2022-A_systematic_literature_review_Risk_analysis_in_clou	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	But behind the benefits obtained by cloud service users, there are also problems or risks that arise, as illustrated when there is a cloud outage by Amazon, because data storage is centralized in the cloud, this can paralyze the company's business that depends on that data (Gupta and Gupta, 2014). Attacks on the cloud computing environment can cause data loss as well as financial losses for cloud service provi-ders as well as cloud servic@@e users (T.K and B, 2016).	Ivon Miranda Santos
Maniah2022-A_systematic_literature_review_Risk_analysis_in_clou	MULTI-CLOUD BENEFITS > Benefits in risk and security	Attacks on the cloud computing environment can cause data loss as well as financial losses for cloud service provi-ders as well as cloud servic@@e users (T.K and B, 2016).	Ivon Miranda Santos

Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	The examples for IAAS include Microsoft Azure and Amazon Web Service (AWS) [2]. Cloud computing has three main types (public, private, and hybrid) with different benefits for each type. The public cloud is a standard cloud computing model in which resources, such as CPU, memory, a repository, and APIs, are available to all users.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Multiple cloud service providers	The examples for IAAS include Microsoft Azure and Amazon Web Service (AWS) [2]. Cloud computing has three main types (public, private, and hybrid) with different benefits for each type. The public cloud is a standard cloud computing model in which resources, such as CPU, memory, a repository, and APIs, are available to all users.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	The examples for IAAS include Microsoft Azure and Amazon Web Service (AWS) [2]. Cloud computing has three main types (public, private, and hybrid) with different benefits for each type. The public cloud is a standard cloud computing model in which resources, such as CPU, memory, a repository, and APIs, are available to all users.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	It is free for organizations for a trial period with limited features, but the payment is necessary for each plan afterwards. Organizations are interested in migrating their legacy local data storage to cloud-based storage to get maximum benefits with less cost, sharing, consistency and scalability. The number of cloud storage providers has increased due to rapid changes in technology.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud management	Organizations are interested in migrating their legacy local data storage to cloud-based storage to get maximum benefits with less cost, sharing, consistency and scalability.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > cloud migration benefit	It benefits organizations for migration to the cloud according to their circumstances.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Cloud computing has substantial benefits that are typically associated with its acceptance, like decreasing functional costs. The computing resource seems unlimited, and scalability is another beauty of cloud computing, where resources can be increased or decreased at runtime. These increasing benefits of the	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > cloud computing benefit	Cloud computing has substantial benefits that are typically associated with its acceptance, like decreasing functional costs.	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud management	All parameter values are taken from the previous section's vendor comparison table. Results are calculated for performance ranking and cost–benefit relationships. Pa-rameters used are number of CPU cores, repository size in gigabytes, sharing (both file sharing and link sharing), operating system (Linux, Windows, or Mac), mobile access (if Yes), free storage in gigabytes (a survey of the internet showed the minimum value is 5 GB), and synchronization (users' device synchronization with their cloud account).	Ivon Miranda Santos
Mateen2021-A_dynamic_decision_support_system_for_selection_of_c	MULTI-CLOUD BENEFITS > Benefits in cloud management	Cost–Benefit Analysis of Cloud Vendors.	Ivon Miranda Santos
Mohamed2020-A_multicriteria_optimization_model_for_cloud_servic	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	B } denote set of parameters that defined the provided service k that offered by provider j, and $|S(\ )|$ $| = B$. Thus, in the context of multicloud provider selection, the cloud broker is responsible for selecting multiple providers that satisfies the customer's requirements in order to minimize the cost and maximize the benefits subject to a set of constraints. The multicloud provider selection model was formulated as integer programming and was built under	Ivon Miranda Santos

Monrat2019-A_Survey_of_Blockchain_From_the_Perspectives_of_Appl	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Specifically, for the financial services sector, blockchain needs to overcome ten key hurdles before becoming a reality in the sector. These include matters concerning with its costs and benefits, cost mutualization, incentives alignment, evolving standards, scalability, gov-ernance, legal risks, security, simplification and regulatory interventions. Laws and regulations could impact how far and how fast the technology could develop.	Ivon Miranda Santos
Monrat2019-A_Survey_of_Blockchain_From_the_Perspectives_of_Appl	MULTI-CLOUD BENEFITS > Benefits in risk and security	Specifically, for the financial services sector, blockchain needs to overcome ten key hurdles before becoming a reality in the sector. These include matters concerning with its costs and benefits, cost mutualization, incentives alignment, evolving standards, scalability, gov-ernance, legal risks, security, simplification and regulatory interventions. Laws and regulations could impact how far and how fast the technology could develop.	Ivon Miranda Santos
Monrat2019-A_Survey_of_Blockchain_From_the_Perspectives_of_Appl	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	There are still many open issues that need to be further researched and analyzed to cre-ate more workable and effective industrial applications that can fully benefit from the use of blockchain and achieve the intended goals. Examples of these open issues include secu-rity, privacy, scalability, energy issues, and integration with other systems and, more specifically, with regulatory issues.	Ivon Miranda Santos
Mostajabi2021-A_Systematic_Review_of_Data_Models_for_the_Big_Da	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	It stores data in a structured and hierarchical manner and with accessibility to different IDs [62].	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	School of Informatics and Digital Engineering, Aston University, United Kingdom Email: n.naik1@aston.ac.uk Abstract—The design of distributed systems in multiple clouds have been gaining popularity due to various benefits of the multi-cloud infrastructure such as minimizing vendor lock-in, data loss and downtime. Nonetheless, this multi-cloud infrastructure also poses several challenges such as compatibility, interoperability, complex provisioning and configuration due to the variation in technologies and services of each cloud provider.	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Abstract—The design of distributed systems in multiple clouds have been gaining popularity due to various benefits of the multi-cloud infrastructure such as minimizing vendor lock-in, data loss and downtime. Nonetheless, this multi-cloud infrastructure also poses several challenges such as compatibility, interoperability, complex provisioning and configuration due to the variation in technologies and services of each cloud provider.	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > multi-cloud benefit	Abstract—The design of distributed systems in multiple clouds have been gaining popularity due to various benefits of the multi-cloud infrastructure such as minimizing vendor lock-in, data loss and downtime.	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Abstract—The design of distributed systems in multiple clouds have been gaining popularity due to various benefits of the multi-cloud infrastructure such as minimizing vendor lock-in, data loss and downtime.	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The designing of distributed systems has many challenges such as successful handling of failure of machines, disks, networks, and software. Distributed systems can be made more effective if they are designed in multiple clouds by leveraging several benefits of the multi-cloud in-frastructure such as minimizing vendor lock-in, data loss and downtime [3], [4]. Nonetheless, this multi-cloud infrastructure also poses several challenges such as compatibility, interop-erability, complex provisioning and configuration due to the variation in technologies and services of each cloud provider [5].	Ivon Miranda Santos

Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > multi-cloud benefit	Distributed systems can be made more effective if they are designed in multiple clouds by leveraging several benefits of the multi-cloud in-frastructure such as minimizing vendor lock-in, data loss and downtime [3], [4].	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Distributed systems can be made more effective if they are designed in multiple clouds by leveraging several benefits of the multi-cloud in-frastructure such as minimizing vendor lock-in, data loss and downtime [3], [4].	Ivon Miranda Santos
Naik2021-Performance_evaluation_of_distributed_systems_in_multi	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The most cited rea-sons for adopting cloud computing includes better scal-ability of IT resources (45.9 %), collaboration (40.5 %), cost savings (39.6 %) and increased flexibility (36.9 %). This suggests that organisations are allured to utilising cloud services due to the perceived business benefits of cost savings, IT flexibility and business agility.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The most cited rea-sons for adopting cloud computing includes better scal-ability of IT resources (45.9 %), collaboration (40.5 %), cost savings (39.6 %) and increased flexibility (36.9 %). This suggests that organisations are allured to utilising cloud services due to the perceived business benefits of cost savings, IT flexibility and business agility.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	The most cited rea-sons for adopting cloud computing includes better scal-ability of IT resources (45.9 %), collaboration (40.5 %), cost savings (39.6 %) and increased flexibility (36.9 %). This suggests that organisations are allured to utilising cloud services due to the perceived business benefits of cost savings, IT flexibility and business agility.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Optimizing cost management	The most cited rea-sons for adopting cloud computing includes better scal-ability of IT resources (45.9 %), collaboration (40.5 %), cost savings (39.6 %) and increased flexibility (36.9 %). This suggests that organisations are allured to utilising cloud services due to the perceived business benefits of cost savings, IT flexibility and business agility.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Scalability	The most cited rea-sons for adopting cloud computing includes better scal-ability of IT resources (45.9 %), collaboration (40.5 %), cost savings (39.6 %) and increased flexibility (36.9 %). This suggests that organisations are allured to utilising cloud services due to the perceived business benefits of cost savings, IT flexibility and business agility.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Flexibility	The most cited rea-sons for adopting cloud computing includes better scal-ability of IT resources (45.9 %), collaboration (40.5 %), cost savings (39.6 %) and increased flexibility (36.9 %). This suggests that organisations are allured to utilising cloud services due to the perceived business benefits of cost savings, IT flexibility and business agility.	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	As shown in Fig. 5, the majority of the respondents identi-fied capacity and scalability (70.3 %), increased collabor-ation, availability, geography and mobility as benefits for migration. However, further analysis have shown, from a business stance, that for organisations with more than	Ivon Miranda Santos

Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Benefits in cloud management	From a portability perspective, it becomes critical that organisations' data is sharable between pro-viders, since without the ability to port data or applica-tion, it would become simply impossible to switch cloud service providers at all [60, 61]. Cloud portability is a sa-lient consideration to enable organisations migrate a cloud-deployed asset to a different provider and it is a direct benefit of overcoming vendor lock-in [62]. Gener-ally, reconfiguration of systems and applications to achieve interoperability is time/resource consuming and may require a considerable amount of expertise, which could be challenging for some organisations. Therefore, from a business perspective, portability should be seen as a key aspect to consider when selecting cloud pro-viders as it can both help mitigate lock-in risks, and de-liver business benefits. This means allowing applications, systems and data components to continue to work cor-rectly when moved between cloud providers'	Ivon Miranda Santos
Opara-Martins2016-Critical_analysis_of_vendor_lock-in_and_its_i	MULTI-CLOUD BENEFITS > Benefits in cloud management	In fact, the study has shown that, while organisations are eager to adopt cloud computing due to its benefits, there is equally an urgent need for avoiding vendor lock-in risks. Moreover, the re-sults of our study have highlighted customers' lack of awareness of proprietary standards which prohibit inter-operability and portability when procuring services from vendors.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Despite the compelling case for moving towards cloud computing, the upstream oil & gas industry faces several technical challenges—most notably, a pronounced emphasis on data security, a reliance on extremely large data sets, and significant legacy investments in information technology infrastructure—that make a full migration to the public cloud difficult at present. Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Despite the compelling case for moving towards cloud computing, the upstream oil & gas industry faces several technical challenges—most notably, a pronounced emphasis on data security, a reliance on extremely large data sets, and significant legacy investments in information technology infrastructure—that make a full migration to the public cloud difficult at present. Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints. This paper argues, however, that the move to private and hybrid clouds will very likely prove only to be a temporary stepping stone in the industry's technological evolution.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	Despite the compelling case for moving towards cloud computing, the upstream oil & gas industry faces several technical challenges—most notably, a pronounced emphasis on data security, a reliance on extremely large data sets, and significant legacy investments in information technology infrastructure—that make a full migration to the public cloud difficult at present. Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints. This paper argues, however, that the move to private and hybrid clouds will very likely prove only to be a temporary stepping stone in the industry's technological evolution.	Ivon Miranda Santos

Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Legal restrictions / Data jurisdiction restrictions	Despite the compelling case for moving towards cloud computing, the upstream oil & gas industry faces several technical challenges—most notably, a pronounced emphasis on data security, a reliance on extremely large data sets, and significant legacy investments in information technology infrastructure—that make a full migration to the public cloud difficult at present. Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints. This paper argues, however, that the move to private and hybrid clouds will very likely prove only to be a temporary stepping stone in the industry's technological evolution.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Security	Despite the compelling case for moving towards cloud computing, the upstream oil & gas industry faces several technical challenges—most notably, a pronounced emphasis on data security, a reliance on extremely large data sets, and significant legacy investments in information technology infrastructure—that make a full migration to the public cloud difficult at present. Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints. This paper argues, however, that the move to private and hybrid clouds will very likely prove only to be a temporary stepping stone in the industry's technological evolution.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Data mangement and privacy	Despite the compelling case for moving towards cloud computing, the upstream oil & gas industry faces several technical challenges—most notably, a pronounced emphasis on data security, a reliance on extremely large data sets, and significant legacy investments in information technology infrastructure—that make a full migration to the public cloud difficult at present. Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints. This paper argues, however, that the move to private and hybrid clouds will very likely prove only to be a temporary stepping stone in the industry's technological evolution.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Private and hybrid cloud solutions have consequently emerged within the industry to yield as much benefit from cloud-based technologies as possible while working within these constraints. This paper argues, however, that the move to private and hybrid clouds will very likely prove only to be a temporary stepping stone in the industry's technological evolution.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	These technical realities of the industry bring about an important question: how can the upstream oil & gas sector yield as much benefit as possible from cloud-based technologies while working within these constraints? Private and hybrid clouds have emerged as popular solutions.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	These technical realities of the industry bring about an important question: how can the upstream oil & gas sector yield as much benefit as possible from cloud-based technologies while working within these constraints? Private and hybrid clouds have emerged as popular solutions.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	These technical realities of the industry bring about an important question: how can the upstream oil & gas sector yield as much benefit as possible from cloud-based technologies while working within these constraints? Private and hybrid clouds have emerged as popular solutions.	Ivon Miranda Santos

Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Legal restrictions / Data jurisdiction restrictions	These technical realities of the industry bring about an important question: how can the upstream oil & gas sector yield as much benefit as possible from cloud-based technologies while working within these constraints? Private and hybrid clouds have emerged as popular solutions.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	In this way, hybrid clouds offer the best of both worlds insofar as this approach makes it possible to manage security-related threats carefully while creating a secure conduit through which customers can selectively leverage the scalability of the public cloud whenever and however they want. Hybrid cloud solutions are a clever way to reap many of the benefits of the public cloud while maintaining a higher degree of control over data security, and they are therefore a very useful bridging technology that customers can use to move towards the public cloud while still hanging on to legacy systems or until software vendors can come up with cloud-friendly alternatives. But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	In this way, hybrid clouds offer the best of both worlds insofar as this approach makes it possible to manage security-related threats carefully while creating a secure conduit through which customers can selectively leverage the scalability of the public cloud whenever and however they want. Hybrid cloud solutions are a clever way to reap many of the benefits of the public cloud while maintaining a higher degree of control over data security, and they are therefore a very useful bridging technology that customers can use to move towards the public cloud while still hanging on to legacy systems or until software vendors can come up with cloud-friendly alternatives.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	In this way, hybrid clouds offer the best of both worlds insofar as this approach makes it possible to manage security-related threats carefully while creating a secure conduit through which customers can selectively leverage the scalability of the public cloud whenever and however they want. Hybrid cloud solutions are a clever way to reap many of the benefits of the public cloud while maintaining a higher degree of control over data security, and they are therefore a very useful bridging technology that customers can use to move towards the public cloud while still hanging on to legacy systems or until software vendors can come up with cloud-friendly alternatives. But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Security	In this way, hybrid clouds offer the best of both worlds insofar as this approach makes it possible to manage security-related threats carefully while creating a secure conduit through which customers can selectively leverage the scalability of the public cloud whenever and however they want. Hybrid cloud solutions are a clever way to reap many of the benefits of the public cloud while maintaining a higher degree of control over data security, and they are therefore a very useful bridging technology that customers can use to move towards the public cloud while still hanging on to legacy systems or until software vendors can come up with cloud-friendly alternatives. But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does.	Ivon Miranda Santos

Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud management	But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does. It therefore follows that these mid-ground solutions do address some of the concerns and issues raised earlier about cloud computing—but they also curtail much of the additional value and functionality that these technologies could potentially deliver. Different approaches have consequently emerged in other industries as they have tried to reach for the additional benefits that the public cloud can offer.	Ivon Miranda Santos
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Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Optimizing cost management	But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does. It therefore follows that these mid-ground solutions do address some of the concerns and issues raised earlier about cloud computing—but they also curtail much of the additional value and functionality that these technologies could potentially deliver. Different approaches have consequently emerged in other industries as they have tried to reach for the additional benefits that the public cloud can offer.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Scalability	But hybrid systems do come at a cost: they do not offer the near-infinite scalability, extremely high "outsourceability," and cost efficiency that the totally public cloud does. It therefore follows that these mid-ground solutions do address some of the concerns and issues raised earlier about cloud computing—but they also curtail much of the additional value and functionality that these technologies could potentially deliver. Different approaches have consequently emerged in other industries as they have tried to reach for the additional benefits that the public cloud can offer.	Ivon Miranda Santos
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Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples presented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer. We also believe that this evidence demonstrates how web-based applications—widely known as "apps"—can play a larger role in the upstream oil & gas sector.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples presented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos
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Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples presented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples presented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos

Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Flexibility	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples pre-sented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Legal restrictions / Data jurisdiction restrictions	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples pre-sented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > Avoid vendor lock-in	Although private and hybrid cloud architectures are popular within the industry at the moment because of existing constraints, the examples pre-sented in this paper point to a future that is increasingly predicated on the public cloud. We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos
Perrons2013-Cloud_computing_in_the_upstream_oil_and_gas_industr	MULTI-CLOUD BENEFITS > cloud computing benefit	We accordingly believe that companies within the upstream oil & gas industry—including international oil companies, national oil companies, service com-panies, and vendors—would be well advised to build into their systems enough flexibility and modularity to make this change when the time is right, thereby allowing them to take full advantage of the benefits that cloud computing can offer.	Ivon Miranda Santos
Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	2013).	Ivon Miranda Santos
Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	2013). Given the multiple benefits of cloud computing, many organizations are keen to adapt to this innovative tech-nology. However, tackling security issues regarding the cloud and the migration process has hampered the cloud adoption rate (Rosado et al.	Ivon Miranda Santos
Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud computing benefit	Given the multiple benefits of cloud computing, many organizations are keen to adapt to this innovative tech-nology.	Ivon Miranda Santos
Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Given the multiple benefits of cloud computing, many organizations are keen to adapt to this innovative tech-nology. However, tackling security issues regarding the cloud and the migration process has hampered the cloud adoption rate (Rosado et al.	Ivon Miranda Santos
Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > cloud migration benefit	This paper is directed towards finding a viable solution to facilitate secure migration of on-premises software ap-plication to the cloud environments. Given the inherent advantages of cloud computing and the desire to migrate to cloud, there has been noteworthy research in the area of cloud migration (Khadka et al. 2013; Andrikopoulos et al. 2013).	Ivon Miranda Santos

Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Recently, several studies have focused on migration to SOA, but not many are found for cloud migration. Both these technologies offer key benefits as reduced overall cost, business agility and easy provisioning of services to the organizations.	Ivon Miranda Santos
Rai2015-Exploring_the_factors_influencing_the_cloud_computing_a	MULTI-CLOUD BENEFITS > Benefits in cloud management	All outcomes should be specified. Outcomes - Secure framework for migration, improved security aspects, performance, cost benefits, applications, tools and techniques. Search string	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	I. INTRODUCTION MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency.	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Benefits in cloud management	MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency.	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Optimizing cost management	MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Scalability	MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Infrastructure management	MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency	Ivon Miranda Santos
Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Flexibility	MODERN IT systems are increasingly adopting cloud computing and moving their workloads on cloud to take advantage of its various benefits such as economies of scale, energy efficiency, scalability, and elasticity. At the same time, the applications that run on cloud require their data to be available in cloud for adequate performance, accurate data processing, and operational efficiency	Ivon Miranda Santos

Ranchal2020-Disrupting_healthcare_silos_Addressing_data_volume_	MULTI-CLOUD BENEFITS > Benefits in risk and security	There have been efforts towards identifying a generic design and the building block services (ingestion, storage, governance, security, privacy) required to build dedicated healthcare cloud platforms.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > multi-cloud benefit	One way to handle this complexity is to devise an intermediary which can take care of the heterogeneity at the cloud and mobile level, and ensure a multi-cloud deployment of application by taking advantage of the best features from different vendors simultaneously.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	To clinch the cloud advantages to its users, lots of cloud providers have emerged in various spaces each one trying to cut an edge over others in terms of service quality, cost, or durability. If there's any new service offering or monetary benefit, or a cloud service outage of the existing provider, technically, any user would be interested to migrate to the new provider. Even big giants such as Amazon have cases of cloud service outages, where its major clients Reddit and Quora could not shift to another provider immediately, and were dysfunctional for more than a day.1	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > multi-cloud benefit	To clinch the cloud advantages to its users, lots of cloud providers have emerged in various spaces each one trying to cut an edge over others in terms of service quality, cost, or durability.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > cloud computing benefit	If there's any new service offering or monetary benefit, or a cloud service outage of the existing provider, technically, any user would be interested to migrate to the new provider.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in cloud management	Gener-ally, to eliminate vendor lock-in, an application needs to be portable and purposely designed to be used across multiple clouds.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Gener-ally, to eliminate vendor lock-in, an application needs to be portable and purposely designed to be used across multiple clouds. A kind of reverse lock-in or lock-out is required to utilize the massive benefits of cloud.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Gener-ally, to eliminate vendor lock-in, an application needs to be portable and purposely designed to be used across multiple clouds. A kind of reverse lock-in or lock-out is required to utilize the massive benefits of cloud. As of today, despite initiatives by NASA since 2013 for "open cloud architectures", not many standards have emerged to support this notion because cloud vendors are not interested for such standards as they will lose competitiveness in the market.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Gener-ally, to eliminate vendor lock-in, an application needs to be portable and purposely designed to be used across multiple clouds.	Ivon Miranda Santos
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Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The authors in this paper3 explain that multiple cloud solutions can be either sequential or simultaneous. When a consumer sequentially consumes services from multiple clouds, it means that once for all, he wishes to migrate to a different provider for cost benefits, contract ending, location-wise legislation issues, or a provider shutdown itself. During simultaneous consumption of services, the con-sumer dynamically places requirement for additional backup, or fault tolerance.	Ivon Miranda Santos

Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The two deliv-ery models that offer the sequential and simultaneous mode of services are the Federated and the Multi-cloud.4 Federated cloud is where all cloud providers have an agreement to rent/lease resources to others for some cost benefits. During this process, the customer is not aware of any of the federal agreement among these cloud providers.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	The two deliv-ery models that offer the sequential and simultaneous mode of services are the Federated and the Multi-cloud.4 Federated cloud is where all cloud providers have an agreement to rent/lease resources to others for some cost benefits. During this process, the customer is not aware of any of the federal agreement among these cloud providers.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Once the expected load cannot be satis-fied by the existing provider, resources from other clouds can be leased. Any spare and unused capacity of the provider can also be shared with other providers for rent with some cost benefits.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > cloud computing benefit	• Optimize costs and save energy One of the main advantages of cloud computing is the "pay-as-you-go" feature. This feature grants monetary benefits for customers by removing the cost of acquiring, provisioning, and operating their own infrastructures. It is just similar to hiring a call tax for travelling, than maintaining an own car. You only pay for the service used, that of travelling and do not worry about the car maintenance and oth-ers. Similarly, smaller organizations would require strong collaboration with other providers without investing heavily on its capital.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in cloud management	One of the main advantages of cloud computing is the "pay-as-you-go" feature. This feature grants monetary benefits for customers by removing the cost of acquiring, provisioning, and operating their own infrastructures. It is just similar to hiring a call tax for travelling, than maintaining an own car.	Ivon Miranda Santos
Ravi2019-Emergence_of_middleware_to_mitigate_the_challenges_of_	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	And with the added credit of mobility features, it can serve a user anywhere and anytime. For this benefit, it is very essential to ensure that multiple cloud services are utilized by the mobile devices with ease, irrespective of the heterogeneity in the programming environments. Let us progress little by little to understand the developments in the mobile space.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Hybrid cloud solutions combine the capabilities of both public clouds along with those of on-premises private cloud environments. In order to key benefit with hybrid cloud model, there are different security issues that have been shown to address. In this paper, we explain security issues in detail such as to maintain trust and authenticity of information, Identity management and compliance which is influencing in enterprises due to migration of IT cloud technologies are increasingly turning to hybrid clouds.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Hybrid cloud solutions combine the capabilities of both public clouds along with those of on-premises private cloud environments. In order to key benefit with hybrid cloud model, there are different security issues that have been shown to address. In this paper, we explain security issues in detail such as to maintain trust and authenticity of information, Identity management and compliance which is influencing in enterprises due to migration of IT cloud technologies are increasingly turning to hybrid clouds.	Ivon Miranda Santos

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Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Cloud computing topic has lot of rapid innovation on Internet from cloud service provider such as Amazon, Open Stacks EC2, through different types of virtual data centers operate across different types of IT environments. Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2]. In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos
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Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Cloud computing topic has lot of rapid innovation on Internet from cloud service provider such as Amazon, Open Stacks EC2, through different types of virtual data centers operate across different types of IT environments. Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2]. In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Infrastructure management	Cloud computing topic has lot of rapid innovation on Internet from cloud service provider such as Amazon, Open Stacks EC2, through different types of virtual data centers operate across different types of IT environments. Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2]. In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos

Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Flexibility	Cloud computing topic has lot of rapid innovation on Internet from cloud service provider such as Amazon, Open Stacks EC2, through different types of virtual data centers operate across different types of IT environments. Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2]. In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Elasticity	Cloud computing topic has lot of rapid innovation on Internet from cloud service provider such as Amazon, Open Stacks EC2, through different types of virtual data centers operate across different types of IT environments. Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2]. In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos

Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Avoid vendor lock-in	Cloud computing topic has lot of rapid innovation on Internet from cloud service provider such as Amazon, Open Stacks EC2, through different types of virtual data centers operate across different types of IT environments. Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2]. In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > cloud computing benefit	Gaining the several benefits, cloud computing provides a more elasticity enabling the on demand approach to an elastic pool of shared computing [1], [2].	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	In the past few years, several business enterprises are go mainstream that by rapid provisioning the cloud resources and to leverage the scale inherent in IT Infrastructure to cut costs and modernize IT operational for service delivery requirements rather than need of purchasing their own expensive IT infrastructure. Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3].	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in cloud management	Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	Today many enterprises for cost savings IT cloud technologies are increasingly turning to hybrid clouds, allowing them to combine the benefits of building private and public clouds as well as to leverage the scale inherent in their existing IT Infra-structure to cut costs and modernize IT operational agility for service delivery requirements. Recently, survey covered that many enterprises are rapidly adopting a multi-cloud approach using different cloud service vendors to support their IT infrastructure [3]. According to survey respondents, Microsoft Azure use 58%, and Amazon Web Services use 52% as their cloud platforms providers. Additionally, Google Cloud use 19%, Oracle Cloud use 9%, and RackSpace use 7.3%.	Ivon Miranda Santos

Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in cloud management	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7].	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7]. The descriptive study in this paper is summarised with a view to discuss and different security issues that have been shown to address.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7]. The descriptive study in this paper is summarised with a view to discuss and different security issues that have been shown to address.	Ivon Miranda Santos
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Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Multiple cloud service providers	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7]. The descriptive study in this paper is summarised with a view to discuss and different security issues that have been shown to address.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Optimizing cost management	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7]. The descriptive study in this paper is summarised with a view to discuss and different security issues that have been shown to address.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Infrastructure management	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7]. The descriptive study in this paper is summarised with a view to discuss and different security issues that have been shown to address.	Ivon Miranda Santos
Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > Application portability between multiple clouds	C. Portability of Applications Using cloud aware development builds systems from re-usable components that will work the same across cloud environments. D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7]. The descriptive study in this paper is summarised with a view to discuss and different security issues that have been shown to address.	Ivon Miranda Santos

Raza2019-A_review_on_security_issues_and_their_impact_on_hybrid	MULTI-CLOUD BENEFITS > cloud migration benefit	D. Monitoring and Management across Cloud Environments In a Hybrid clouds, monitoring and management is essential for the health of the system, visibility into system health across clouds is crucial In spite of such significant benefits, migration of IT cloud technologies from enterprises have important aspect over privacy, integrity, security concerns and compliance considerations due to reliability on multi cloud vendors such as Microsoft, Amazon and Google [7].	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Companies expect to reduce their costs, to gain flexibility and an unlimited resource access (Mueller et al., 2011). Due to the lack of a universal definition and various perceptions of Cloud Computing, including the related benefits and challenges, many companies struggle to make use of the Cloud concept (Nuseibeh, 2011; Leavitt, 2009; Marston et al. 2011).	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Companies expect to reduce their costs, to gain flexibility and an unlimited resource access (Mueller et al., 2011). Due to the lack of a universal definition and various perceptions of Cloud Computing, including the related benefits and challenges, many companies struggle to make use of the Cloud concept (Nuseibeh, 2011; Leavitt, 2009; Marston et al. 2011).	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > Optimizing cost management	Companies expect to reduce their costs, to gain flexibility and an unlimited resource access (Mueller et al., 2011). Due to the lack of a universal definition and various perceptions of Cloud Computing, including the related benefits and challenges, many companies struggle to make use of the Cloud concept (Nuseibeh, 2011; Leavitt, 2009; Marston et al. 2011).	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	, 2011).	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > cloud computing benefit	Due to the lack of a universal definition and various perceptions of Cloud Computing, including the related benefits and challenges, many companies struggle to make use of the Cloud concept (Nuseibeh, 2011; Leavitt, 2009; Marston et al.	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > cloud computing benefit	Truong (2010) explained how to use Cloud Computing to enhance competitive advantages for small businesses and uses the resource based view of the firm to suggest that individual Cloud offerings provide an un-imitable competitive advantage. Related to this field Shimba (2010) discussed strategies for Cloud Computing adoption in his doctoral thesis. Considering the strategic role of Cloud Computing it reflects a new way in which IT can be used more strategically in business value creation (Son and Lee, 2011). From the perspective of strategic IT use, the value of Cloud Computing enables businesses to enhance dynamic capabilities and to hold its business competence in the market (Teece et al., 1997; Pavlou and El Sawy, 2006).	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Benlian et al.	Ivon Miranda Santos
Repschlaeger2012-Cloud_requirement_framework_Requirements_and_e	MULTI-CLOUD BENEFITS > cloud computing benefit	Flexibility Provisioning and set-up time are subsumed under the associated flexibility advantage of Cloud Computing. Resources, for instance, can be allocated and de-allocated as required. The provisioning time is shorter compared to traditional outsourcing and the set-up time to get in contact with the provider (e.g. register or set up a new account) is shorter as well.	Ivon Miranda Santos

Rosati2018-Making_the_cloud_work_for_software_producers_Linking	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	, 2012). Similarly, from a technical perspective, the benefits of the cloud are well documented including on-demand, self-service, resource pooling and rapid elasticity (Armbrust et al., 2010).	Ivon Miranda Santos
Rosati2018-Making_the_cloud_work_for_software_producers_Linking	MULTI-CLOUD BENEFITS > Multiple cloud service providers	, 2012). Similarly, from a technical perspective, the benefits of the cloud are well documented including on-demand, self-service, resource pooling and rapid elasticity (Armbrust et al., 2010).	Ivon Miranda Santos
Rosati2018-Making_the_cloud_work_for_software_producers_Linking	MULTI-CLOUD BENEFITS > Elasticity	, 2012). Similarly, from a technical perspective, the benefits of the cloud are well documented including on-demand, self-service, resource pooling and rapid elasticity (Armbrust et al., 2010).	Ivon Miranda Santos
Rosati2018-Making_the_cloud_work_for_software_producers_Linking	MULTI-CLOUD BENEFITS > cloud computing benefit	Notwithstanding these benefits, cloud computing adoption also generates significant challenges for software producers (SPs), particularly for those offering a Software-as-a-Service (SaaS) model.	Ivon Miranda Santos
Rosati2018-Making_the_cloud_work_for_software_producers_Linking	MULTI-CLOUD BENEFITS > Benefits in cloud management	SPs typically migrate their software to a third-party platform (Infrastructure-as-a-Service – IaaS – or	Ivon Miranda Santos
Rosati2018-Making_the_cloud_work_for_software_producers_Linking	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	2.2 Two Migration Business Cases Cloud computing adoption can dramatically change a company business model and internal organization, and requires investing a significant amount of resources in the migration process.	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	Research surrounding migration of applications to cloud has been underway since the advent of cloud. A significant challenge initially in cloud migration is the lack of a general process in selecting cloud models and the studies on the risks and benefits involved in migration. There are now many step-by-step decision processes such as the one proposed by Cloudstep [1].	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud management	There have also been numerous studies on the cost-benefit tradeoff for migration of different applications [2].	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	It is also called the 'lift-and-shift' process. This is one of the fastest solutions for migration but has limited scalability, as the true benefits of cloud cannot be reaped. Moreover, most legacy applications are specifically designed for local usage and are not equipped to handle distributed workloads.	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	It is also called the 'lift-and-shift' process. This is one of the fastest solutions for migration but has limited scalability, as the true benefits of cloud cannot be reaped. Moreover, most legacy applications are specifically designed for local usage and are not equipped to handle distributed workloads.	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The application is therefore deployed on cloud and has a microservice architecture, hence making it cloud native. This gives the added benefit of scalability, availability and fault isolation. VIII.	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > cloud computing benefit	The primary motivation for migrating such applications is to take advantage of higher network speeds, reducing technical debt and cost of maintenance. Small applications that require a temporary boost in performance would be good candidates for this approach. Large applications which are resource-intensive may not gain significant benefits and may need other approaches to take advantage of the cloud. Applications without web incompatible UI cannot be rehosted.	Ivon Miranda Santos

Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > cloud migration benefit	The primary motivation for migrating such applications is to take advantage of higher network speeds, reducing technical debt and cost of maintenance. Small applications that require a temporary boost in performance would be good candidates for this approach. Large applications which are resource-intensive may not gain significant benefits and may need other approaches to take advantage of the cloud. Applications without web incompatible UI cannot be rehosted.	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud management	Small applications that require a temporary boost in performance would be good candidates for this approach. Large applications which are resource-intensive may not gain significant benefits and may need other approaches to take advantage of the cloud.	Ivon Miranda Santos
Shastry2022-Approaches_for_migrating_non_cloud-native_applicati	MULTI-CLOUD BENEFITS > Benefits in cloud management	Some of the existing work dealt with the assessment of application suitability to cloud and the cost-benefit analysis of migration.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The Amazon EC2 service level agreement (SLA)31 offers 99.95% uptime per month and claims a 10% discount on service cost in case of SLA viola-tion.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	Recently, Amazon and Microsoft advertised the same SLA with 99.95% avail-ability for each; hence, it will be converted into 99.9999% availability in the case of using a combination of both clouds.32 In MCE, the atomic web services are composited to deliver a user value-added coarse-grain service.33-35 In the other words, instead of single sourcing, a user deploys multisourcing as "best-in-breed" sourcing from an immense cloud market to find composited services with low cost and better QoS, which comply with his/her SLA.36 Since the cloud market is ever increasing in terms of providers and miscellaneous services and there is no one service directory unit, the broker mecha-nism is applied to mitigate the complexity of user service delivery.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > multi-cloud benefit	Thus, the cloud economic problem is converted into a bioptimization problem, by which the model must simultaneously solve a Pareto set, compromising the service cost and security risks in terms of financial losses. Some researchers have propounded a service selection method, not a decision model, to figure out the problem with multiple criteria derived from their Delphi pan-elists' interview.42,43 However, in the related works, there are some drawbacks as well as benefits. For instance, some of the related works focus on just sheer economic or limited factors, which have less influence on security issues. Nevertheless, so far, there is yet no decision model to decide between cloud migration versus on-premises IT development with regard to cost and cybersecurity risk perspectives. Moreover, each of which is not agile enough to take into account a variety of service types, a new organization policy, new cloud pricing schemes, and multisourcing cloud for reaching a sustainable decision point. To deal with the aforementioned problem and challenges, we develop an iterative decision model to decide between the development of internal IT and cloud migration for organization. The main contributions of this paper are as follows	Ivon Miranda Santos

Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Thus, the cloud economic problem is converted into a bioptimization problem, by which the model must simultaneously solve a Pareto set, compromising the service cost and security risks in terms of financial losses. Some researchers have propounded a service selection method, not a decision model, to figure out the problem with multiple criteria derived from their Delphi panelists' interview.42,43 However, in the related works, there are some drawbacks as well as benefits. For instance, some of the related works focus on just sheer economic or limited factors, which have less influence on security issues.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	3 However, in the related works, there are some drawbacks as well as benefits. For instance, some of the related works focus on just sheer economic or limited factors, which have less influence on security issues.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	3 However, in the related works, there are some drawbacks as well as benefits. For instance, some of the related works focus on just sheer economic or limited factors, which have less influence on security issues.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud migration process	For instance, some of the related works focus on just sheer economic or limited factors, which have less influence on security issues.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	(1) On-demand self-service: individuals and organizations can use cloud on-demand instances if they cannot present their accurate resource usage pattern; otherwise, they can take benefit of cloud reserved/bid instances to reduce their costs.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	(5) Measured service: it causes customers to monitor their used services helping to take future suitable strategies. Moreover, CC takes benefit of the service-oriented architecture (SOA) with which the reusability attribute of components makes loosely coupled and platform-independent software develop-ment especially over the Internet. Moreover, everything is provisioned as a service, XaaS, where X is software, hardware, platform, infrastructure, data, business, etc.46,47 However, all of them is categorized in the 3 standard forms of the soft-ware/platform/infrastructure model.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Multiple cloud service providers	(5) Measured service: it causes customers to monitor their used services helping to take future suitable strategies. Moreover, CC takes benefit of the service-oriented architecture (SOA) with which the reusability attribute of components makes loosely coupled and platform-independent software develop-ment especially over the Internet. Moreover, everything is provisioned as a service, XaaS, where X is software, hardware, platform, infrastructure, data, business, etc.46,47 However, all of them is categorized in the 3 standard forms of the soft-ware/platform/infrastructure model.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Infrastructure management	(5) Measured service: it causes customers to monitor their used services helping to take future suitable strategies. Moreover, CC takes benefit of the service-oriented architecture (SOA) with which the reusability attribute of components makes loosely coupled and platform-independent software develop-ment especially over the Internet. Moreover, everything is provisioned as a service, XaaS, where X is software, hardware, platform, infrastructure, data, business, etc.46,47 However, all of them is categorized in the 3 standard forms of the soft-ware/platform/infrastructure model.	Ivon Miranda Santos

Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Four service deployment types are private, public, hybrid, and community. Private cloud can be owned and managed by a single organization; public cloud is open for the general public to use at a low fee. It is owned and managed by a third party. The community cloud is used for individuals and organizations with the same mission, policy, benefit, etc. Moreover, hybrid cloud includes composition of 2 or more clouds (private, community, or public) that are known unique entities.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Infrastructure management	Four service deployment types are private, public, hybrid, and community. Private cloud can be owned and managed by a single organization; public cloud is open for the general public to use at a low fee. It is owned and managed by a third party. The community cloud is used for individuals and organizations with the same mission, policy, benefit, etc. Moreover, hybrid cloud includes composition of 2 or more clouds (private, community, or public) that are known unique entities.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	It is owned and managed by a third party.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The community cloud is used for individuals and organizations with the same mission, policy, benefit, etc. Moreover, hybrid cloud includes composition of 2 or more clouds (private, community, or public) that are known unique entities.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Multiple cloud service providers	We can enumerate several major cloud service providers such as Microsoft, Salesforce, Sky-tap, HP, IBM, Amazon, and Google. For instance, the Amazon web service provides 4 core services such as Simple Storage Service (S3), Elastic Compute Cloud (EC2), Simple Queue Service, and SimpleDB.49 In other words, Amazon currently offers storage capacity, computer processing time, message queuing, and a database management system as plug-and-play services that are accessed over the Internet.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Optimizing cost management	We can enumerate several major cloud service providers such as Microsoft, Salesforce, Sky-tap, HP, IBM, Amazon, and Google. For instance, the Amazon web service provides 4 core services such as Simple Storage Service (S3), Elastic Compute Cloud (EC2), Simple Queue Service, and SimpleDB.49 In other words, Amazon currently offers storage capacity, computer processing time, message queuing, and a database management system as plug-and-play services that are accessed over the Internet.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	The cloud market encounters new service publishing from both new added providers and current service providers.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	The cloud market encounters new service publishing from both new added providers and current service providers. To address the problem of technology delivery complexity to users, clouds take benefit of brokers; this way, customers can select cost-effective services with better QoS complying with SLA.32,44,48 In this paper, we specifically concentrate on MCE security for mission-critical applications	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	To address the problem of technology delivery complexity to users, clouds take benefit of brokers; this way, customers can select cost-effective services with better QoS complying with SLA.32,44,48 In this paper, we specifically concentrate on MCE security for mission-critical applications.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	To do so, we present a system framework and add a module in a cloud broker to log matrix information of security SLA (price, availability, integrity, and confidentiality; cf, Section 3.3.2).	Ivon Miranda Santos

Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	Moreover, adopting SOA techniques provides facilities to deliver services from a multisourcing cloud from a single service to composite web services, which can be provisioned by different providers	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Moreover, using multicloud ser-vices brings several benefits such as lock-in avoidance, a fault-tolerant system, and low security risks in failure, hardware corruption, service disruption, and sanction circumstances.27 Although the advantages of CC are trivial for everyone, each technology such as CC has its new threats and risks as well as related merits especially for the third party with unknown data/service jurisdiction.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > multi-cloud benefit	Moreover, using multicloud ser-vices brings several benefits such as lock-in avoidance, a fault-tolerant system, and low security risks in failure, hardware corruption, service disruption, and sanction circumstances.27 Although the advantages of CC are trivial for everyone, each technology such as CC has its new threats and risks as well as related merits especially for the third party with unknown data/service jurisdiction.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	Moreover, using multicloud ser-vices brings several benefits such as lock-in avoidance, a fault-tolerant system, and low security risks in failure, hardware corruption, service disruption, and sanction circumstances.27 Although the advantages of CC are trivial for everyone, each technology such as CC has its new threats and risks as well as related merits especially for the third party with unknown data/service jurisdiction. Hence, if the threats are materialized, then it may cause lack of control, BF interruption, QoS degradation, loss of customer satisfaction and confidence, disruption in BC, and loss of organization reputation; conse-quently, it causes security risks, potential financial losses, and even business failure.52 CC suffers from several security threats that cannot be disregarded.38	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	As the European Union Agency for Network and Information Security (ENISA)53 and previous research studies14,39,54 stipulate, the security tenets for IS are availability, integrity, and confidentiality.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > multi-cloud benefit	Cloud multisourcing can offer a variety of deployment options. Multiple providers are offering different virtual devices and computing units with different pricing and security levels in the market. Multicloud also brings several benefits such as vendor lock-in avoidance and system fault tolerance.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in vendor lock-in	Multiple providers are offering different virtual devices and computing units with different pricing and security levels in the market. Multicloud also brings several benefits such as vendor lock-in avoidance and system fault tolerance.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	Multicloud also brings several benefits such as vendor lock-in avoidance and system fault tolerance. As such, open APIs provide portability and a high degree of flexibility.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Multicloud also brings several benefits such as vendor lock-in avoidance and system fault tolerance. As such, open APIs provide portability and a high degree of flexibility.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Multicloud also brings several benefits such as vendor lock-in avoidance and system fault tolerance.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	3.4 Cloud decision model By using multicloud as a multisourcing option to cover business functional and nonfunctional requirements, several bene-fits are brought to users (whether individuals or organizations), such as a fault-tolerant system, lock-in avoidance, low risk, etc. As such, web service composition is selected to meet the needs, which is made possible by multicloud SOA reusabil-ity.	Ivon Miranda Santos

Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	3.4 Cloud decision model By using multicloud as a multisourcing option to cover business functional and nonfunctional requirements, several bene-fits are brought to users (whether individuals or organizations), such as a fault-tolerant system, lock-in avoidance, low risk, etc. As such, web service composition is selected to meet the needs, which is made possible by multicloud SOA reusabil-ity.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > multi-cloud benefit	3.4 Cloud decision model By using multicloud as a multisourcing option to cover business functional and nonfunctional requirements, several bene-fits are brought to users (whether individuals or organizations), such as a fault-tolerant system, lock-in avoidance, low risk, etc. As such, web service composition is selected to meet the needs, which is made possible by multicloud SOA reusabil-ity. Figure 5 shows the web service composition in cloud application. There are several cloud applications with different composition patterns, ie, sequence, parallel, and branch and loop,77-79 which are supported by Business Process Execution Language,80 but for the sake of simplicity, we consider the sequence pattern, as can be seen in Figure 7. Consequently, the cloud decision model intends to find the optimal composition to minimize both service costs and security risks.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in risk and security	3.4 Cloud decision model By using multicloud as a multisourcing option to cover business functional and nonfunctional requirements, several bene-fits are brought to users (whether individuals or organizations), such as a fault-tolerant system, lock-in avoidance, low risk, etc. As such, web service composition is selected to meet the needs, which is made possible by multicloud SOA reusabil-ity.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	System framework: To take benefit of the multicloud for mission-critical applications, this paper applies combinato-rial optimization concepts for web service composition, which utilizes multiple clouds. Our system framework is similar in system design as those in previous works.33,81,82 It has several modules that are illustrated in Figure 6.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	System framework: To take benefit of the multicloud for mission-critical applications, this paper applies combinato-rial optimization concepts for web service composition, which utilizes multiple clouds. Our system framework is similar in system design as those in previous works.33,81,82 It has several modules that are illustrated in Figure 6	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > multi-cloud benefit	To take benefit of the multicloud for mission-critical applications, this paper applies combinato-rial optimization concepts for web service composition, which utilizes multiple clouds.	Ivon Miranda Santos
Shirvani2018-An_iterative_mathematical_decision_model_for_cloud	MULTI-CLOUD BENEFITS > Benefits in cloud management	As previously stated, annually, the resource requirement makes increasing costs of cloud options in comparison with	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > multi-cloud benefit	An advantage of RWFM is that it provides a uniform solu-tion for securing various kinds of hybrid cloud architectures ranging from the simple pairwise federation to the complex interclouds, and supporting varying degrees of flexibility in workload placement ranging from a simple static placement to fully dynamic migration. Further, RWFM framework is forensic-ready by design, because the labels of data and services readily provide the necessary forensic information. Index Terms—Cloud Computing, Hybrid Cloud, Security and Privacy.	Ivon Miranda Santos

Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	HYBRID CLOUD While there are substantial benefits in using cloud services from cost as well as flexibility, it suffers from the fact that the users are not clear about the security and privacy of their data. Storing data on places/locations on which either the	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Benefits in cloud management	A SECURE ARCHITECTURE FOR HYBRID CLOUD In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager. Further, we also illustrate the working of the approach with a concrete example (no loss of generality), and compare the benefits of our approach with related works.	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	A SECURE ARCHITECTURE FOR HYBRID CLOUD In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager.	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	A SECURE ARCHITECTURE FOR HYBRID CLOUD In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager. Further, we also illustrate the working of the approach with a concrete example (no loss of generality), and compare the benefits of our approach with related works. A. A General Approach to Securing Hybrid Cloud Consider the architecture shown in Figure 2.	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	A SECURE ARCHITECTURE FOR HYBRID CLOUD In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager. Further, we also illustrate the working of the approach with a concrete example (no loss of generality), and compare the benefits of our approach with related works.	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Multiple cloud service providers	A SECURE ARCHITECTURE FOR HYBRID CLOUD In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager. Further, we also illustrate the working of the approach with a concrete example (no loss of generality), and compare the benefits of our approach with related works.	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Security	A SECURE ARCHITECTURE FOR HYBRID CLOUD In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager. Further, we also illustrate the working of the approach with a concrete example (no loss of generality), and compare the benefits of our approach with related works.	Ivon Miranda Santos
Shyamasundar2017-Information_flow_control_for_building_security	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	In this section, we provide a general approach for securing a hybrid cloud by integrating an RWFM monitor into the cloud service manager. Further, we also illustrate the working of the approach with a concrete example (no loss of generality), and compare the benefits of our approach with related works.	Ivon Miranda Santos
SOrheller2018-Implementing_cloud_erp_solutions_A_review_of_soci	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Hence, the increasing interest for cloud deployments of ERPs [1, 2] is not surprising. The benefits of cloud-based ERPs relate to cost effectiveness, time savings, scalability and ease of updates [1, 3, 4]. Nevertheless, the implementation of cloud ERPs is not straightforward and there are significant issues that need to be taken into account when launching cloud ERP initiatives.	Ivon Miranda Santos

SOrheller2018-Implementing_cloud_erp_solutions_A_review_of_soci	MULTI-CLOUD BENEFITS > Benefits in cloud management	The benefits of cloud-based ERPs relate to cost effectiveness, time savings, scalability and ease of updates [1, 3, 4].	Ivon Miranda Santos
SOrheller2018-Implementing_cloud_erp_solutions_A_review_of_soci	MULTI-CLOUD BENEFITS > cloud migration benefit	Our concept matrix illustrates that there is a gap in the literature as regards cloud-based ERP implementation relative to size of organizations. Johansson and colleagues identified in their study that SMEs and large businesses face different challenges [4] and mention that there is too little research comparing them, which is also confirmed by our matrix. We suggest that more research should be done towards this direction. The literature shows that large, medium and small businesses can have different advantages and challenges associated with implementation of cloud-based ERPs. Interestingly, there are few prior research studies that address the implementation of cloud-based ERP solutions in large-size businesses.	Ivon Miranda Santos
SOrheller2018-Implementing_cloud_erp_solutions_A_review_of_soci	MULTI-CLOUD BENEFITS > cloud migration benefit	Due to low implementation costs and simplicity, vendors mostly target SMEs. Furthermore, several of the articles reviewed are not stating explicitly the size of organization under study. It is important for research to be properly contextualized in order to be useful for further development and we urge researchers to report as much contextual information as possible (e.g. organization size, industry, years in operation).	Ivon Miranda Santos
Sousa2016-Automated_Setup_of_Multi-Cloud_Environments_for_Micro	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	In a microservices architecture, applications are composed of small services that run in separate processes and can be deployed to different environments.	Ivon Miranda Santos
Sousa2016-Automated_Setup_of_Multi-Cloud_Environments_for_Micro	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	We argue that these two approaches have strong synergism.	Ivon Miranda Santos
Sousa2016-Automated_Setup_of_Multi-Cloud_Environments_for_Micro	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Multi-cloud computing has the potential of reducing vendor dependence, increasing application reliability and optimizing resource usage. However, the wide number of available cloud providers, their high heterogeneity and their intricate configu-ration options, make it very complex to exploit these benefits. In this paper, we describe an approach to deal with this complexity, by supporting the selection and configuration of multi-cloud environments for microservices-based applications.	Ivon Miranda Santos
Sousa2016-Automated_Setup_of_Multi-Cloud_Environments_for_Micro	MULTI-CLOUD BENEFITS > Benefits in cloud service providers	However, the wide number of available cloud providers, their high heterogeneity and their intricate configu-ration options, make it very complex to exploit these benefits. In this paper, we describe an approach to deal with this complexity, by supporting the selection and configuration of multi-cloud environments for microservices-based applications.	Ivon Miranda Santos
Tona2020-DPS-AA_Intranet_migration_strategy_model_for_clouds	MULTI-CLOUD BENEFITS > Benefits in cloud management	They provided in-depth inputs and the facts about issues, limitations and challenges of the existing state of art intranet in the university system. From their responses, it was revealed that 97.37% respondents are aware about cloud and 89.47 % are using cloud services with promised trust and benefits and interested to have an alternative model/solution for Intranet for modernizing and upgrading the intranet features or services with enhanced performance of the existing Intranet. The fig.	Ivon Miranda Santos
Weerasinghe2022-Taxonomical_classification_and_systematic_revie	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	To achieve complete benefits of the cloud services application, developers need to change the application architecture to the cloud-native microservice architecture.	Ivon Miranda Santos

Wright2011-A_commodityfocused_multi-cloud_marketplace_exemplar_	MULTI-CLOUD BENEFITS > Benefits in cloud management	The capability to select resources based on service requirements and (more recently) on historical data on what is actually delivered by a provider has proven invaluable. In addition, the capability to define scenarios and define cost models to compare performance based on these models has delivered tangible performance benefits to our application and enabled an application focused choice. Thus, for example, we can balance the CPU speed required by our transcoding services to the bandwidth at a provider and the storage infrastructure performance to enable a practical choice for a media streaming service location.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	{zhoubiyu, zhangfa, zyliu}@ict.ac.cn, jiewu@temple.edu Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services. Enterprise application migration is an effective way to improve the efficiency of using the cloud infrastructures.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > cloud computing benefit	Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services. Enterprise application migration is an effective way to improve the efficiency of using the cloud infrastructures.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Multiple cloud service providers	Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services. Enterprise application migration is an effective way to improve the efficiency of using the cloud infrastructures.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Optimizing cost management	Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services. Enterprise application migration is an effective way to improve the efficiency of using the cloud infrastructures.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Infrastructure management	Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services. Enterprise application migration is an effective way to improve the efficiency of using the cloud infrastructures.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Legal restrictions / Data jurisdiction restrictions	Abstract—Hybrid cloud-based deployment is a trend in cloud computing which enables enterprise to benefit from cloud infras-tructures while honoring privacy restrictions on some services. Enterprise application migration is an effective way to improve the efficiency of using the cloud infrastructures.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud management	This benefit mainly stems from the cloud's economies of scale and the buy-on-demand model of cloud computing. However, migrating the entire enterprise application to public cloud may introduce issues in security, performance and reliability [1].	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	This benefit mainly stems from the cloud's economies of scale and the buy-on-demand model of cloud computing. However, migrating the entire enterprise application to public cloud may introduce issues in security, performance and reliability [1].	Ivon Miranda Santos
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Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	However, migrating the entire enterprise application to public cloud may introduce issues in security, performance and reliability [1].	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	In order to solve this issue, both academia and industry have proposed solutions in recent years [1–8].	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	In order to solve this issue, both academia and industry have proposed solutions in recent years [1–8].	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	However, they are ineffective against typical medium-scale enterprise applications in which thousands of servers are involved. In addition, while existing works have done a good job exploring the benefits of deploying applications in the simple two clouds environment(which contains both a private and a public cloud), they seldom evaluate the benefits of employing a hybrid cloud architecture with a private cloud and multiple geographically distributed public clouds. In fact, many large cloud providers (e.g., Amazon Web Services [9] and Microsoft Azure [10]) enabled the placement of instances in multiple locations. In this paper, our objective is to explore the benefits of migrating medium- and large-scale enterprise applications to hybrid cloud infrastructures, in which a local cloud and multiple geographically distributed public clouds are involved. To solve this problem, we propose a simple but efficient three-stage framework:	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	However, they are ineffective against typical medium-scale enterprise applications in which thousands of servers are involved. In addition, while existing works have done a good job exploring the benefits of deploying applications in the simple two clouds environment(which contains both a private and a public cloud), they seldom evaluate the benefits of employing a hybrid cloud architecture with a private cloud and multiple geographically distributed public clouds. In fact, many large cloud providers (e.g., Amazon Web Services [9] and Microsoft Azure [10]) enabled the placement of instances in multiple locations. In this paper, our objective is to explore the benefits of migrating medium- and large-scale enterprise applications to hybrid cloud infrastructures, in which a local cloud and multiple geographically distributed public clouds are involved. To solve this problem, we propose a simple but efficient three-stage framework:	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Cloud-native/microservice architecture	However, they are ineffective against typical medium-scale enterprise applications in which thousands of servers are involved. In addition, while existing works have done a good job exploring the benefits of deploying applications in the simple two clouds environment(which contains both a private and a public cloud), they seldom evaluate the benefits of employing a hybrid cloud architecture with a private cloud and multiple geographically distributed public clouds. In fact, many large cloud providers (e.g., Amazon Web Services [9] and Microsoft Azure [10]) enabled the placement of instances in multiple locations. In this paper, our objective is to explore the benefits of migrating medium- and large-scale enterprise applications to hybrid cloud infrastructures, in which a local cloud and multiple geographically distributed public clouds are involved. To solve this problem, we propose a simple but efficient three-stage framework:	Ivon Miranda Santos

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Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Leveraging the characteristics of enterprise applications, we propose a three-stage framework to solve the problem.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Leveraging the characteristics of enterprise applications, we propose a three-stage framework to solve the problem.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	The actual savings for a specific server depend on the resource requirement of the server, the server renting price of the cloud provider and the operation condition of the on-premise data center.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	The actual savings for a specific server depend on the resource requirement of the server, the server renting price of the cloud provider and the operation condition of the on-premise data center. Since we consider a static scenario in this paper, the operation cost benefit of each server vi using each public cloud $\pi(i)$ is assumed to be a constant, denoted by $\alpha i,\pi(i)$.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Optimizing cost management	The actual savings for a specific server depend on the resource requirement of the server, the server renting price of the cloud provider and the operation condition of the on-premise data center. Since we consider a static scenario in this paper, the operation cost benefit of each server vi using each public cloud $\pi(i)$ is assumed to be a constant, denoted by $\alpha i,\pi(i)$.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud management	Since we consider a static scenario in this paper, the operation cost benefit of each server vi using each public cloud	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	Obviously the value of $\gamma i,\pi(i)$ can also be pre-computed. Let H(x) denote the total benefits leveraging the hybrid cloud infrastructure; thus it can therefore be expressed as $H(x) = vi\epsilon V\ \gamma i,\pi(i) -$	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	Obviously the value of $\gamma i,\pi(i)$ can also be pre-computed. Let H(x) denote the total benefits leveraging the hybrid cloud infrastructure; thus it can therefore be expressed as $H(x) = vi\epsilon V\ \gamma i,\pi(i) -$	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	It can be seen that neither plan 2 nor plan 3 are applicable (NA) due to the violation of the time constraint. When all servers are migrated to public clouds (plan 2 and plan 3), the enterprise achieves the maximum benefits, but its time costs are high (30 and 31 respectively).	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Optimizing cost management	It can be seen that neither plan 2 nor plan 3 are applicable (NA) due to the violation of the time constraint. When all servers are migrated to public clouds (plan 2 and plan 3), the enterprise achieves the maximum benefits, but its time costs are high (30 and 31 respectively).	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	On average, EAM Algo reduces 27.80% and 12.74% more costs compared with ALL-In-Tokyo and All-In-NOVA, respectively.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	On average, EAM Algo reduces 27.80% and 12.74% more costs compared with ALL-In-Tokyo and All-In-NOVA, respectively.	Ivon Miranda Santos

Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	V. CONCLUSION	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in multicloud architecure	V. CONCLUSION In this paper, we study the problem of migrating enterprise applications to hybrid cloud for cost benefits maximization. Unlike previous works, this work considers a more general hy-brid cloud architecture involving multiple public clouds rather than one.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud management	In this paper, we study the problem of migrating enterprise applications to hybrid cloud for cost benefits maximization.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud infraestruture	In this paper, we study the problem of migrating enterprise applications to hybrid cloud for cost benefits maximization. Unlike previous works, this work considers a more general hy-brid cloud architecture involving multiple public clouds rather than one.	Ivon Miranda Santos
Zhou2017-Cost_reduction_in_hybrid_clouds_for_enterprise_computi	MULTI-CLOUD BENEFITS > Benefits in cloud-native architecture	Unlike previous works, this work considers a more general hy-brid cloud architecture involving multiple public clouds rather than one.	Ivon Miranda Santos