

Analysis of Benefit Considerations for Guarantee Company Upgrading to Tier 4 Colocation Data Center in Indonesia

Ferdata Adhitya Winarno Putra^{1*}, Jarot S. Suroso²
Universitas Bina Nusantara Jakarta, Indonesia
Email: ferdata.putra@binus.edu^{1*}, jsembodo@binus.ac.id²

*Correspondence

ABSTRACT

Keywords: Data Center; Hyper-converged infrastructure; Colocation Data Center; Data Center Migration.

This research is motivated by the need for the guarantee company to improve the management of the availability of information technology services to all company stakeholders in the guarantee company data center migration project. The guarantee company is currently collaborating with data center colocation service providers to support information technology infrastructure needs as a location for placing hyper-converged infrastructure servers. One of the objectives of this study is to provide recommendations to company management regarding improvements related to operational efficiency, increased scalability and capacity, reliability, increased availability, increased security factors, compliance with regulations, and the ability to increase data recovery in the event of a disaster by evaluating and maintained for enterprise data center migration plans. This research focuses on how the benefits of data center migration are currently at the highest level, which will be explained in this paper, where the author will provide a systematic and measurable visualization regarding facts and relationships in carrying out the stages of activity, starting with data collection, analysis, and making suggestions in improving colocation data services in the area of the country of Indonesia.



Introduction

The financial industry is currently implementing a digitalization process. IT infrastructure is obligatory to support this process. One of its needs is a data center, which can currently be met through a Colocation data center where physical facilities provide space, electric power, air conditioning, security, and network connectivity (Nirwana, Hasibuan, & Hedyanto, 2018). Since the economy is growing fast, the need to provide data centers is also growing in the same direction, where companies do not need to invest in building data centers, working together with data center colocation providers instead (Asali & Afrianto, 2017).

Research on the market conducted in 2015 shows that data center investment in Indonesia was 50% of the investment, while hardware and software investment was another 50%. It is estimated that in 2016, it will reach US\$14.13 billion and continue to grow to US\$31.95 billion by the end of 2022 (Nazim et al., 2019).

Guarantee Company is currently officially part of the insurance and guarantee. Guarantee Company is a legal entity engaged in the financial sector, with its main business activities of Guarantee Company targeted to support government policies, especially in the context of encouraging business independence and empowering the business world, primarily micro, small, and medium enterprises, and cooperatives at the national level (Wang et al., 2019).

Guarantee Company, a company in the non-bank sector, plays a vital role in UMKM expanding access to credit, enabling UMKM to benefit from financing provided by the Bank (Saraswati, 2021). Guarantee Company is currently working with financial institutions consisting of national banks, regional banks, private banks, and non-bank partners as the number of Guarantee Company partners (Wang et al., 2019).

Guarantee Company is a Guarantee institution that is fully committed to supporting government programs in the field of economy and national development; in its current management, Guarantee Company manages 28,018,916 customer data, where the number of customer data in the last three years kept growing, this continuity require service improvement so that Guarantee Company can continue to compete with competitors in terms of Guarantee volume competition provided by partners who are working with financial institutions consisting of National Banks, Regional Banks, Private Banks, and Non-Bank Partners as the number of Guarantee Company partners (Adywiratama et al., 2022).

Table 1
Customer Growth Yoy

No	Customer	Year	Growth
1	8.401.034	2020	
2	18.058.840	2021	115%
3	28.018.916	2022	55%

Information technology services can run optimally to support the process of exchanging data with corporate partners; Guarantee Company currently utilizes server on-premises technology as the central infrastructure in carrying out business processes in managing transaction and non-transaction data (Fitriasari, 2017).

Guarantee Company conducted real-time business transactions with all stakeholders, processing a significant volume of Rp 4 billion within a one-hour timeframe. This rapid data exchange demands special attention, particularly from a financial risk perspective. The potential risk can be mitigated by increasing the availability of colocation data centers so that the risk of data exchange processes being hampered and impacting company income can be avoided (Wahyuni, 2024).

Table 2
Total Transaction

Financial Loss (Unit: Rupiah)		
No	Business Function	1 Hour
1	Institutional Guarantee Product 1	22.321.429
2	Institutional Guarantee Product 2	12.338.790
3	Business Guarantee Product 1	2.406.096.122
4	Business Guarantee Product 2	595.675.332
Total		3.036.431.672

The supporting infrastructure needed is a data center; Guarantee Company works with Colocation Data Center Service Providers to manage the infrastructure as a data storage center and data exchange process with Stakeholders in providing a Colocation Data center so that the company can focus on running their primary business processes (Eckhardt & Doeker, 2024).

Information technology services can continue to run optimally to support exchanging data with corporate partners. Guarantee Company utilizes on-premise server technology as the central infrastructure in carrying out business processes in managing transaction and non-transaction data, in addition to the supporting infrastructure needed, namely colocation data centers which cooperate with colocation data center service providers to manage infrastructure as a data storage center and data exchange process with stakeholders (Krisnawati, 2016).

According to Uptime Institute’s tier classification system, which is a classification standard used to assess the level of availability and performance of data centers where currently, there are four levels with unique characteristics, including tier 1, tier 2, tier 3, and tier 4 which are the highest levels in service availability for power, network, and operational management.

In today's digital era, all components of business management must be digital-based (Yamada, 2016). Their abilities must be increased to a competent level using the latest technology, especially in the provision and operation of data centers, which are the essential components of all existing services and must be at the highest level of competence, namely in data centers with Tier 4 levels.

A data centre (Ayuni, 2017) is a central repository, both physical and virtual, for the storage, management, and deletion of data and information from certain knowledge sections. Four stages characterise the data center based on a combination of efficiency, availability, and flexibility: (1) Basic, (2) Consolidated, (3) Available, and (4) Strategic so that the data center can be used as a safe place for computer equipment, storage media, and communication equipment, as well as networks used as data processing sites.

Research Methods

In researching colocation data center migration analysis, which will be discussed, the author will provide a visualization with systematic and measurable accuracy related to facts and relations in carrying out the stages of activity.

The primary method used is a literature study, interviews, observation, and gap analysis of tier 3 and tier 4 classification based on the Uptime Institute classification, which is used as a parameter to achieve the desired research results.

The steps include identifying current conditions, comparing tier 3 and tier 4 colocation, and providing recommendations/suggestions based on the tier 4 data center classification.

The scope of this research focuses on the needs of Guarantee Company to evaluate the current use of colocation data center services, taking into account the development of data management with all stakeholders in the process of exchanging data digitally. In addition, the guarantee company also needs to evaluate the applicable regulatory provisions as a form of compliance; the guarantee company is currently using a colocation data center at one level below the highest level, namely tier 4.



Figure 1. Framework

Results and Discussion

Analysis Colocation Data Center Current Conditions with Colocation Data Center Tier 4

Guarantee company currently uses tier 3 data center colocation services in carrying out all business digitization processes; this requires an evaluation in maintaining the availability of the Company's information technology services to obtain information to

what extent the current conditions of tier 3 data center colocation services are against top-level conditions that exist, namely tier 4 data center colocation, as well as to get additional benefits for the improvements that will be obtained later.

The steps taken are to map the top-level Tier 4 conditions by comparing the current conditions based on the main parameters, namely uptime guarantee, downtime value per year, component redundancy, and certification owned by colocation data center service providers to obtain gap analysis, as for the details of the mapping results represented by in Table 3.

Table 3
Gap Classification Data Center

Parameters	Tier 3	Tier 4	Gap
Uptime guarantee	99,98%	99,995%	Yes
Downtime per year	< 1,6 Hours	< 26,3 Minutes	Yes
Component redundancy	Full N+1	Fault-tolerant (2N or 2N+1)	Yes
Certification	Uptime Tier III (Facility)	Uptime Tier IV (Design and Facility)	yes
	ISO 27001:2013	ISO 27001:2013	No
	PCI DSS	PCI DSS	No
		TARA	Yes
	SOC type 1	Yes	
	SOC type 2	Yes	

From the results of observations based on specifications and certification and then mapping the conditions of colocation data center service providers in Indonesia that have been carried out, the results of gap analysis are found in all main parameter areas of tier 3 data centers and tier 4 data centers. This gap is a difference that characterizes the level classification of the tier in the data center.

The results obtained from the analysis based on mapping the current colocation conditions tier 3 with the tier 4 colocation data center level have gaps in all main parameters.

Areas with gaps are areas where it is possible to increase the benefits that will be obtained for Guarantee Company that initially used colocation data centers from tier 3 to tier 4. The improvements are as follows:

- a) The Uptime guarantee area, which initially had a tolerance of 1.5 hours of downtime, will get an increase to a downtime of less than 26.3 minutes in one year; this can help Guarantee Company avoid the potential for unachieved information technology services.
- b) Area Component redundancy, essential systems such as power supply and coolers, originally had N+1 redundancy to 2N. This means that the power supply and cooler become more optimal by having a dual system for all components to have a higher tolerance for the risk of system failure.
- c) Area Certification data center, which is a feasibility assessment of design and facilities, assessment activities, and evaluation processes carried out by an independent party, namely the Uptime Institute, verifies to ensure that the facility meets specific reliability, availability, security, and operational efficiency standards.
 1. This area has increased the existing certification from each colocation data center service provider, where tier 4 certification is obtained for the design and facilities area and certification; this certification area ensures that all infrastructure in the colocation data center has been tested.
 2. Increased threat and vulnerability risk assessment activities in the risk assessment area in conducting assessments and potential risks throughout the infrastructure. It is also equipped with PCI DSS certification related to protecting sensitive transaction data and payment processes for colocation data center service users.
 3. The security area also increased when a report with AICPA (American Institute of Certified Public Accountants) standards was issued by an independent party for the assessment and testing process related to the internal control of colocation data centre providers.

Table 4
Gap Mapping and Improvement Results

Parameters	Gap	Improvement
Uptime guarantee	Yes	Yes
Downtime per year	Yes	Yes
Component redundancy	Yes	Yes
Certification	Yes	Yes (4 Certification)

It can be concluded that there has been a significant increase in all parameters of the current tier 3 data centre colocation conditions with tier 4 data centre colocation in the aspect of maintaining maximum reliability and availability of information technology processes for Guarantee Company.

By leveraging the highest classification data centre services, underwriting companies can significantly improve reliability, availability, and redundancies. The guarantee company can avoid the risk of downtime in supporting equipment, infrastructure and networks. In addition to maintaining the performance of the availability

of services provided during maintenance, the Tier 4 data centre guarantees that the maintenance carried out cannot affect all running processes.

In fulfilling compliance with applicable regulations, if you have used a tier 4 colocation data centre, the guarantee company has been able to ensure compliance with regulations because the provider has complied with the applicable regulations. By complying with all applicable regulations, the guarantee company can also improve its reputation and trust in building high trust in all stakeholders.

Conclusion

The analysis results of the current tier 3 data centre colocation with the top tier 4 colocation data centre at the Guarantee Company conclude that gaps can be repaired. Based on all mapped area parameters, gaps were found, which can be used as an essential reference for improving services to become a tier 4 colocation data centre.

This analysis demonstrates the potential benefits of Credit Guarantee Company migrating to a Tier 4 data centre based on a 3-year evaluation of service improvement and consistent achievement of SLAs (100%); the findings suggest that a Tier 4 data centre could effectively support improved business processes for the company.

Deploying Tier IV data centres with the highest levels of redundancy and fault tolerance by the Uptime Institute's Tier Standards can help guarantee company reduce risk and significantly increase service availability. Tier IV standards are the highest level standards in terms of data centre availability and reliability, designed to reduce the risk of failures that could disrupt a guaranteed company's business operations.

This approach would ensure exceptional information technology (IT) service availability with minimal downtime risk and provide the highest level of redundancy in equipment, infrastructure, and network connectivity. Consequently, Guarantee Company is likely to experience a positive impact on its reputation for reliable service delivery and resilience against potential failures, fostering trust among all business partners.

The Guarantee Company obtains documentation of current tier 3 colocation services. It compares the current tier 3 colocation data centre with the top tier 4 colocation data centre so that the company can consider the need for increased effort in managing the guarantee company's information technology services.

This analysis of the use of tier 3 and tier 4 data centre colocation services provides suggestions that may be taken into consideration for guaranteeing company management to improve services based on the benefits obtained. This analysis is different from other analyses because the results specifically discuss the benefits of improving current colocation data center services in Guarantee Company to the highest level in the data center classification which can improve services, especially in the guarantee industry.

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