



### Run the Bank

IT Security  
IT Availability & Reliability



### Internal IT Transformation

IT Organization & Resources  
CISO Office Establishment  
Strengthen IT project Delivery  
Improve IT Governance  
Improve IT Sourcing, procurement & Vendor management  
Communications & Change Management



### Strategic Initiatives

Security & Infrastructure  
Channel  
Process & Analysis  
Core Service  
Internal Service & Government

## IT TRANSFORMATION

One form of IT Transformation is to build a work environment that provides open space concept space which we call Mandiri Digicub. Digicub is specially designed to support the development of solutions with collaboration between business and IT with agile development. This workspace can be a place to raise the products that will become Bank Mandiri's flagship products in the future.

the operational implementation of Bank Mandiri's Information Technology in line with applicable regulations and best practice. It is also aligned with the improvement of process business by taking into account confidentiality, integrity, availability, reliability, continuity, compliance, and the principle of effectiveness and efficiency.

## Policies and Governance of Information Technology

The Governance of Information Technology need to be improved continuously according to its progress through periodic review. The Governance of Information Technology becomes the guideline of information technology planning, development, and operational processes by adopting the regulation of Financial Services Authority and Bank Indonesia Regulation, yet still considering the characters and strategies Bank Mandiri's business.

In 2017, adjustments on policy and information technology governance procedures were made with the details as follows:

### 1. Standard Operating Procedures of Information Technology

It is a guideline of Information Technology Governance starting from the stages of planning, development, operational management, to the end-to-end IT security applicable in Bank Mandiri including Overseas Branches. IT SOP is arranged to make

IT SOP is a guide that contains provisions and/or procedures as the elaboration of Bank Mandiri's Operational Policy (KOBM). It refers to the Regulator's provisions and Internal rules of the Bank. The underlying provisions of the Regulator are:

- The Law of the Republic of Indonesia No. 10 of 1998 on Banking;
- The Law of the Republic of Indonesia Number 19 of 2016 on Amendment of Law Number 11 of 2008 on Electronic Informations and Transactions;
- Government Regulation (PP) No. 82 of 2012 on Electronic Transaction System Management;
- Financial Services Authority Regulation No. 38/POJK.03/2016 dated 1 December 2016; and
- Circular Letter of Financial Services Authority No. 21/SEOJK.03/2017 dated 6 June 2017 about Risk Management Implementation in the Utilization of Information Technology By Public Bank.

Internally, IT SOP is based on:

- Bank Mandiri's Operational Policy (KOBM);
- Decision of Risk Capital Committee - Operational Risk Committee (RCC-ORC) dated 21 December 2012; and
- Decision of Procedure and Policy Committee (PPC) dated 23 November 2017.

## 2. Technical Guidelines of Operation (PTO) related to Information Technology (IT)

It is a set of provisions that manages processes or technical implementation steps based on IT SOP. As for PTO related to Information Technology (IT) applied by Bank Mandiri are as follows:

### a. Information Technology Planning

It is a guideline for work unit when planning information technology, that consists of information technology strategic initiative planning, annual information technology planning processes, information technology strategic research and review processes, and information technology architecture planning process.

### b. IT Project Management

It provides a guideline in conducting the stages of IT Strategic Initiative Project development, thus there is a standard in implementing each stage of the development phase, with quality as the first concern for each project launched.

### c. Operational Management of IT

It is a guideline that regulates the Operational Management of Information Technology. This includes operation management of the system, backup and restore process management, infrastructure management, and system monitoring and maintenance processes.

### d. Information Technology Security

It is a guideline for work unit concerning information technology security aspects, including physical and environment securities, network security, application system security, and company security.

### e. End User Computing Management

It is a guideline for work unit in performing system/application development, which provision, development, and management processes are carried out by Information Technology User Work Unit.

### f. IT Application User Management

It is a guideline for work unit that is related to Information Technology system/application access management that covers user creation, changes, and removal processes of a system/application.

### g. The Use of Information Technology Service Provider

It is a guideline that regulates the process of designating Information Technology service provider and its evaluation.

### h. Source Code Management

It is a guideline that manages source code storing process that covers the source code, both owned by the bank or not, and that stored by escrow agent.

In addition to adjusting the policies and procedures, good Information Technology Governance needs a harmony between People, Process, and Technology. Information Technology Governance of Bank Mandiri adopts various frameworks, such as:

### Control Objectives for Information and Related Technologies (COBIT)

Bank Mandiri's IT applies COBIT to provide IT Governance management practice standard framework and objective IT Related Enabler control guideline to connect between processes of businesses, controls, and technical issues thus it can be used by business owners, auditors, and users. Bank Mandiri's IT performs update version using COBIT 5, built from COBIT 4.1, to increase the trust and strategic information system.

### Project Management Professional (PMP)

PMP is an international certification issued by Project Management Institute, an independent institution in Pennsylvania, United States. Bank Mandiri's IT uses PMP to organize, monitor, direct, and manage resources through Project Management to increase project's success rate and support business processes.

### The Open Group Architecture Framework (TOGAF)

TOGAF has been broadly tested and validated on many organizations in all around the world. TOGAF provides the framework of Bank Mandiri's IT enterprise architecture by identifying the enterprise information architecture design, implementation, and governance comprehensively. By using TOGAF, Bank Mandiri's IT can achieve an equal balance of information technology efficiency and business innovation.

**Information Technology Infrastructure Library (ITIL)**

ITIL consists of compiled frameworks of information technology governance best practice from various fields and industries, including financial. ITIL provides a guideline for best practice in information technology service management that can be adopted and adapted by organizations based on the business needs, condition, and the maturity of the service provider. ITIL intends to ensure that IT service is aligned with business needs and plays an active role to support the business, increase IT services user satisfaction, improve efficiency and operational management, and speed up the development of new product and service.

**International Organization for Standardization 20000 (ISO 20000)**

It is an international standard that is used in Information Technology Service Management to improve Institution Service quality and fix the work processes to optimize the services and encourage IT service improvement continuously. Since 2014, Bank Mandiri has achieved ISO 20000 Certification and in 2017, Bank Mandiri has succeeded to maintain ISO 20000 Recertification for the next three years with the scope of "The Service Management System of IT Application Support Group and IT Infrastructure Group of PT Bank Mandiri (Company), Tbk. That Supports Internal Customers at Jakarta Headquarter." Hence, Bank Mandiri is able to provide services that meet the customer needs.

**International Organization for Standardization 9001 (ISO 9001)**

Quality management system application is a strategic decision to Company that can help Bank Mandiri to improve its efficiency comprehensively and provides a strong foundation for sustainable improvement initiatives. This has been applied in Bank Mandiri's IT unit that has ISO 9001 certification since 2003 with the scope of: "Operation and Development of Data Centre, DRC, IT Security and Infrastructure" that helps Bank Mandiri deliver reliable and safe banking services.

In 2017, Bank Mandiri has succeeded in upgrading ISO 9001:2008 to ISO 9001:2015. There is a new clause in ISO 9001:2015 to ensure the improvement of quality management implementation in Bank Mandiri IT, which eventually can guarantee the banking service quality, increase customer satisfaction, and improve Bank's productivity.

**Information Technology Risk Management**

As one of the Bank Mandiri IT security improvement strategies, CISO organization was formed as a lead of information security bankwide strategy arrangement and to handle tactical and operation necessities. When performing its business activities, Bank Mandiri faces various risks that must be mitigated, so the business activities may perform well. The use of Information Technology is a critical operational risk that turns into a focus of the Company to be well-managed. Company routinely and consistently performs risk management process by applying Risk Control Self-Assessment (RCSA) towards Information Technology utilization that covers as follows:

1. Risk identification  
Performing updates to risk lists related to end-to-end Information Technology based on job description, policies, procedures, audit records, and risk profile from the last three months.
2. Risk assessment  
Performing control testing on the identified risks by using test script to set effective rate of the Information Technology control. Work units must prepare action plan and control reinforcement if the control testing checking result indicates that there is a control that does not work optimally.
3. Risk monitoring  
Bank performs risk monitoring periodically on Operation Risk Profile Report (LPRO) and ensures that all of action plans and control reinforcement are executed accordingly in a timely manner.
4. Risk control and mitigation  
Risk control or mitigation (action plan) is performed consistently according to risk level that will be taken, operation risk valuation result, and control testing.

## Information Technology Infrastructures

Bank Mandiri's IT Infrastructures are supported by Data Center (DC) facilities with "Three Site DC Topology" concept that consists of Mandiri Plaza DC and 2 (two) Disaster Recovery Center (DRC) in Rempoa and Balikpapan. The primary management principles of Bank's IT general infrastructures can be described as follows:

### Updated

Bank periodically performs IT infrastructure update to adjust the business development and growth and IT development plans. In 2017, the Core Banking system capacity and new ATM Switching machines have been added.

### Tested

Bank routinely performs IT Disaster Recovery Plan (DRP) testing to ensure procedure, IT devices, and HR preparation to face emergency conditions that may disrupt Bank's operations. Throughout 2017, 35 switch-over (testing) have been performed to support the business continuity during emergency conditions. The Bank also has Business Recovery Center (BRC) facility as emergency work location for critical work units when main location is not accessible.

### Standardized

The standardization of IT service is conducted to maintain the operation reliability, accelerate measured and monitored problem solving, and provide excellent support to Company's business as our commitment. Bank Mandiri's IT work unit implements certified service standard, which are:

- ISO 9001:2015 untuk Operations and Development of Data Center, DRC, IT Security and Infrastructure.
- ISO/IEC 20000-1:2011 untuk Provisions of IT Service Management System to Internal Customer.



Besides, Bank also implements IT device standard in Data Center and for daily operations for operation uniformity and effectiveness, and ensures the support from third party.









## Monitoring, Maintenance and Optimization

Bank has a Command Center as the center to monitor all IT infrastructure operations that work 24 x 7 and also Service Desk as the first layer to support all IT issues occurring in all channels that also work 24 x 7. Another routine activity is the implementation of preventive maintenance to IT and housekeeping devices, as well as fine tuning in the application.

Other Data Center supports during 2017 were related to strategic initiative needs through 343 application promotion/migration activities and Tandem Machine Migration performed in order to increase ATM transaction capacity to 900 TPS (transaction per second).

To support business continuity during emergency conditions, IT infrastructure operation in Mandiri Plaza DC is supported by Rempoa DRC, which was built by referring to Data Center Uptime Institute standards, officially in operation since 1 October 2015. As a double disaster risk mitigation for Mandiri Plaza DC and Rempoa DRC, Bank Mandiri's IT infrastructure operation is supported by Balikpapan DRC facilities.

## Development of Bank Mandiri DRC

							
<ul style="list-style-type: none"> <li>Have 1 DRC (Cikarang)</li> <li>Study of DRC # 2 in Kalimantan</li> <li>Three tests of DRP were performed</li> </ul>	<ul style="list-style-type: none"> <li>Increased capacity of DRC # 1 (Cikarang)</li> <li>Operational DRC # 2 (Balikpapan)</li> <li>6 DRP tests were performed</li> </ul>	<ul style="list-style-type: none"> <li>Optimization of DRC # 1 cabling (Cikarang)</li> <li>Performed 7 times DRP testing</li> <li>DRC runs internet banking services during the test period</li> </ul>	<ul style="list-style-type: none"> <li>Rejuvenation and addition of cooling system DRC # 1 (Cikarang) and DRC # 2 (Balikpapan)</li> <li>Study and design of DRC in Rempoa as a replacement for DRC # 1 (Cikarang)</li> <li>Performed 10 times DRP testing</li> <li>DRC runs internet banking services during the test period</li> </ul>	<ul style="list-style-type: none"> <li>Development of DRC in Rempoa as the successor of DRC # 1 (Cikarang)</li> <li>11 tests of DRP were performed</li> <li>DRC performs core banking functions when upgrading the core banking machine in the Data Center</li> </ul>	<ul style="list-style-type: none"> <li>Operational DRC Rempoa, migrating from DRC # 2 (Cikarang) to DRC Rempoa</li> <li>Conducted 5 times DRP testing</li> </ul>	<ul style="list-style-type: none"> <li>DRC Rempoa completely replaces DRC # 2 (Cikarang)</li> <li>6 DRP tests were performed</li> <li>DRC performs the ATM Switching function in the test period</li> <li>DRC study as a replacement for DRC # 2 (Balikpapan), the result of the study designates Surabaya as the location of the new DRC</li> </ul>	<ul style="list-style-type: none"> <li>Finalization of Data Center design and completion of DRC development permit process in Surabaya</li> <li>8 DRP tests were performed</li> <li>DRC performs core banking, internet banking, ATM Switching, SMS Banking, USSD, Prepaid System, Middleware, RTGS, BI-SSSS &amp; BI-ETP, SKN, KLN and ATM network services</li> </ul>

2000 - 2010	2011	2012	2013	2014	2015	2016	2017
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## Implementation of Information Technology Policy

### Execution of IT Programs In 2017

During 2017, IT programs has been performed to support Bank Mandiri efforts to reduce the Company's Non Performing Loan (NPL) ratio by implementing several IT initiatives that focused on credit quality improvement, such as performing enhancement to risk calculation model (for example the usage of Advance Internal Rating Based (AIRB) model approach), monitoring Bank risk profiles, monitoring debtor risks, pipeline management, limit management, portfolio management, value chain process enhancement, and system automation to minimize all risks that can lead to NPL improvement. IT initiatives are among others:

#### 1. Enterprise Risk Management (ERM) Initiative

System ERM development initiative was performed through AIRB model Approach calculation implementation as an effort to manage credit risks and monitoring through ATMR (Risk Weighted Assets) reports. By implementing ERM System, the Bank has Early Warning System for every debtor's risk, so earlier anticipation can be performed to the debtors with potential NPL

#### 2. SME Customer Monitoring Application Initiative

The monitor application system development of SME (Small Medium Enterprise) customer portfolio management that can be accessed realtime to increase the awareness of relationship managers to their managed customers from portfolio level to NPL monitoring

#### 3. Credit Submission System Development Initiative for Wholesale Segment

The development of Bank Mandiri Integrated Processing System (IPS) to fasten the credit processes, credit quality improvement, every debtor quality description and Bank credit and risk profile monitoring by implementing AIRB Approach method utilization according to BASEL regulations. The SME segment pipeline process and credit approval through Stop and Go Booking can help to improve the credit quality.

#### 4. Credit Submission System Development Initiative for Wholesale Segment for Value Chain Acquisition Process

The development of Bank Mandiri Integrated Processing System (IPS) to implement new routing for Value Chain on Commercial and SME segments, so the expansion process can be performed in measured risk.

#### 5. Credit Portfolio Strengthen Initiative

The system development to process credit by end-to-end starting from pipeline process to monitoring collectibility status and monitoring portfolio for Cash Loan and Non Cash Loan. The system has capability to decide whether a credit process can move to the next process if it meets the applicable criteria, pipeline administration and management for Wholesale segment (Corporate and Commercial), sectoral limit utilization monitoring and watchlist debtor account monitoring for Wholesale segment

Besides, Information Technology support also being performed to help accelerating Bank Mandiri business through initiatives as follows:

#### 1. Core Banking Tuning and Data Services

Bank Mandiri core banking capability improvement as banking transaction management center and build Bank Mandiri capability to consolidate customer data and data management analysis is performed through Big Data and Master Data Management initiatives

#### 2. Fraud and Risk Management

In order to perfecting early detection system capability to suspicious transactions and better bank risk management is performed through Fraud and Risk Management System implementation and Enterprise Risk Management Enhancement.

#### 3. IT Infrastructure Upgrade

IT infrastructure upgrade is performed to support business expansion and as an effort to strengthen IT network security and system reliability through initiative.

#### 4. Enhance Middleware and Internal Support

Middleware system development as application backbone and system development to accommodate bank internal necessities is performed through solution development initiative related to National Social Security and SAP development.

#### 5. Customer/Account Onboarding and Relationship Services Platform

Provides platform for Bank to interact with the customer is performed through integrated retail business process re-engineering initiative and e-APR and e-MTK application development..

#### 6. Enhancement Electronic Channel and Transaction Processing System

Electronic channel service development by focusing to give uniform and safe online transaction experiences for all Bank Mandiri electronic channels through Mandiri Cash Management (MCM) and New Banking Mobile and Internet Banking Initiatives.



## Information Technology Development Plan In The Future

Future Bank Mandiri information technology development has been planned and arranged in line with Company corporate plan, which is to strengthen Bank core business on wholesale segment and float new core business on retail segment. 2018 development will focus on several streams as follows:

- 1) Support retail business segment through channel development and distribution network expansion in form of physical and digital networks that allow the provision of omni-channel and seamless experience services for customers;
- 2) Retail business segment acceleration in customer product marketing through system capability improvement and development that can support sales, marketing and campaign management when offering banking product an service according to customer necessities;
- 3) Capacity increase and IT infrastructure reliability to balance the business growth and necessities through infrastructure renovation and optimized core banking implementation to improve system stability;
- 4) Support operation effectiveness and efficiently through core function development and improvement, supportive IT system and application perfection and banking service and product management that allow new product and complex development; and
- 5) Information technology development to help business decision making through big data and data warehouse capability development for effective and efficient information analysis, tier integration and workflow development that allow internal and external connectivity seamlessly through enterprise service bus and improvement and development implementation of bank fraud, risk and security management.

