NEW MAS ELECTRONIC PAYMENT SYSTEM (MEPS+)

SELF-ASSESSMENT OF OBSERVANCE WITH THE CORE PRINCIPLES FOR SYSTEMICALLY IMPORTANT PAYMENT SYSTEMS

2012
1. EXECUTIVE SUMMARY

1.1 The effective functioning of financial markets depends on safe and efficient payment systems, particularly systemically important payment systems. As systemically important payment systems are the means by which funds are transferred among banks, they can transmit economic shocks across markets and international borders. Hence, these systems should be well designed and operated to avoid any exacerbation of economic disturbances.

1.2 The Core Principles for Systemically Important Payment Systems ("Core Principles"), which is a set of ten international standards developed in 2001 by the Committee on Payment and Settlement Systems ("CPSS") of the central banks of the Group of Ten countries, set out the types and levels of risk mitigation that should be exhibited by a safe and efficient systemically important payment system. They provide a benchmark for central banks in their oversight of payment systems and are used as guidelines for operators of systemically important payment systems in their design and operation of these systems to minimise financial risks.

1.3 Based on the Core Principles, the Monetary Authority of Singapore ("MAS") has performed a self-assessment of the New MAS Electronic Payment System ("MEPS+"), which is owned and operated by MAS. The results of the self assessment showed that MEPS+ has observed nine of the ten core principles. Core Principle V is not applicable to MEPS+.

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<thead>
<tr>
<th>Brief Description of Core Principle</th>
<th>Observed</th>
<th>Broadly Observed</th>
<th>Partly Observed</th>
<th>Non-observed</th>
<th>Not Applicable</th>
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<tbody>
<tr>
<td>I Well founded legal basis</td>
<td>✓</td>
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<td>II Understanding financial risks by Participants</td>
<td>✓</td>
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<tr>
<td>III Management of financial risks</td>
<td>✓</td>
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<tr>
<td>IV Prompt settlement finality</td>
<td>✓</td>
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<td>V Robustness of multilateral netting arrangements</td>
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<td>-</td>
<td>✓</td>
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<tr>
<td>VI Safe settlement asset</td>
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<td>VII Good security and operational reliability</td>
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<tr>
<td>VIII Practical and efficient means of payment</td>
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<tr>
<td>IX Fair and open access</td>
<td>✓</td>
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<tr>
<td>X Effective, accountable and transparent governance arrangements</td>
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2.0 DETAILED ASSESSMENT BY CORE PRINCIPLE

2.1 Core Principle I

The system should have a well-founded legal basis under all relevant jurisdictions

2.1.1 This core principle requires that the operations of a payment system as well as the payment transfers through the system have a sound and solid legal basis.

2.1.2 The main legislations providing the legal framework for MEPS+ are:

- Section 29A of MAS Act;
- Payment Systems (Oversight) Act 2006 (“PS(O)A”);
- Payments and Settlement Systems (Finality and Netting) Act (“FNA”); and
- Electronic Transaction Act (“ETA”).

Section 29A of MAS Act

This provides MAS with the legal authority to establish and operate a real time gross settlement system; to issue rules and regulations on the conduct of participants; and enter into agreements with participants. The five main agreements governing the system are: (i) the MEPS+ Service Agreement; (ii) Terms and Conditions Governing the Operation of the Current Account; (iii)
Terms and Conditions Governing the Operation of the Accounts for Singapore Government Securities ("SGS") and MAS Bills; (iv) Terms and Conditions Governing the MAS Intraday Liquidity Facility; and (v) PSA/ISMA Global Master Repurchase Agreement.

Payment Systems (Oversight) Act 2006 ("PS(O)A")
MEPS+ is designated under PS(O)A as a systemically important payment system. PS(O)A establishes the basis for oversight of MEPS+ and its participants by the regulators in MAS.

Payments and Settlement Systems (Finality and Netting) Act ("FNA")
This makes provision for the protection of payment and settlement systems from disruptions that may arise as a result of legal uncertainties during events such as the commencement of insolvency proceedings of a participant. As a designated system, the FNA provides the legal certainty that all transactions settled by MEPS+ are final and irrevocable notwithstanding the insolvency of a participant. Pursuant to Sections 12 and 14 of the FNA, the zero hour rule1 does not apply, and no court in Singapore shall recognize or give effect to an order of the courts in a foreign jurisdiction to reverse or unwind payments that have been settled in MEPS+.

MAS has implemented a new offline contingency module ("OCM") that will be activated in the extreme event where both MEPS+ RTGS production and disaster recovery ("DR") sites are disrupted concurrently. OCM allows MAS to continue processing and settling interbank payment transactions on a real time gross basis. MAS is in the process of amending the Payment and Settlement Systems (Finality and Netting) Order 2006 (the "Order") to expressly include OCM as part of MEPS+.

Electronic Transaction Act ("ETA")

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1 A provision in the insolvency law of some countries whereby the transactions conducted by an insolvent institution after midnight on the date the institution is declared insolvent are automatically ineffective by operation of law.
The ETA recognizes the validity of electronic records and digital signatures. As all payment instructions are settled in MEPS+ electronically, the ETA establishes with certainty that electronic documentation can be cited in a court of law in Singapore.

2.2 **Core Principle II**
*The system’s rules and procedures should enable participants to have a clear understanding of the system’s impact on each of the financial risks they incur through participation in it*

2.2.1 The aim of this core principle is to ensure that the contractual arrangements, available documentation and publications for the payment system enable its participants to understand the system’s impact on each of the financial risks they bear through participation in the payment system.

2.2.2 All MEPS+ participants are signatories of the MEPS+ Service Agreement, which contains the operating rules that spell out the general duties of the participants and explains the different financial risks that participants may face:

(a) Rules relating to liquidity risks are circulated as Clause 14, where the Intraday Liquidity Facility ("ILF") is described.

(b) Rules relating to credit risks, the question of insolvency, and systemic risks are dealt with explicitly in Clauses 12, 16, 17 and 18.

(c) Rules relating to operational risks are covered in Clauses 19, 20 and 21 where manual backup and recovery facilities are described.

2.2.3 Operational and contingency procedures for MEPS+ are outlined clearly in the Operations and Contingency Manual for MEPS+ Participants and Non-Participants, which is accessible to all participants on the MAS website.

2.2.4 Participants are provided with MEPS+ User Manuals which document the detailed processing flow of participants’ transactions, as well as provide
detailed illustrations on the entire life cycle of a payment (from the receipt of payment instructions from a participant to the point of settlement or cancellation).

2.2.5 All participants also have access to MEPS+ test environment to perform transactions and familiarize themselves with MEPS+ functionalities.

2.3 Core Principle III

The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain risks.

2.3.1 Under this core principle, the design and functionalities of the payment system should protect its participants against credit risk and enable them to manage their liquidity risk appropriately.

Credit Risk

2.3.2 Credit exposure between participants arises when there is a delay between a payment’s acceptance by the payment system for settlement and its final settlement. Credit risk does not arise in MEPS+ as transactions are settled on a real-time gross basis, as long as funds are available. In addition, MEPS+ allows participants to set various payment limits, such as counterparty limits.

2.3.3 In providing the ILF to participants, MAS has the potential to incur credit exposures to the participants. However, this is managed by requiring participants to enter into repo transactions with MAS using their own unencumbered SGS or MAS Bills as collateral in exchange for the intraday liquidity.

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2 Participants are required to observe the Terms and Conditions Governing the MAS Intraday Liquidity Facility and sign the PSA/ISMA Global Master Repurchase Agreement.
2.3.4 The SGS and MAS Bills held as collateral constitute the highest quality collateral available domestically, and are subject to a lending haircut of 2% or such other rate as MAS may notify of, to cater for market movements. Besides the margin of safety afforded by high quality collateral subject to haircuts, there are additional safeguards. For the ILF, MAS is entitled to reverse the repo transaction at the end of the day and to secure funds covering the repurchase price either directly from the affected participant’s MEPS+ account or by selling the SGS or MAS Bills that MAS had obtained in the opening leg of the repo transaction. If there is still a shortfall, MAS is entitled to seek the return of liquidated damages as per the Terms and Conditions Governing the MAS ILF.

**Liquidity Risk**

2.3.5 Participants are responsible for managing their liquidity risk which affects the probability of timely settlement. They have access to on-line and real-time information on their balances in their MEPS+ accounts, settled transactions, as well as queued inward and outward transactions, which enable them to manage their liquidity efficiently through the MEPS+ queue management capability. In addition, participants may manage their liquidity requirements by setting bilateral limits, overall payment limits, or setting aside funds for a specific counterparty or transaction. These limits are lifted automatically by MEPS+ at 3.30pm to improve overall system liquidity and facilitate settlement of outstanding transactions.

2.3.6 At the system level, MEPS+ employs multilateral settlement algorithm to resolve gridlock in the system. MEPS+ makes use of several gridlock detection parameters according to which the system checks for gridlock and activates gridlock resolution to break any impasses.

2.3.7 MAS monitors MEPS+ payment flows for anomaly through the MEPS+ reports that cover daily vital statistics relating to the payment and queue statuses, monthly summaries, annual reports of transaction volume and other
important metrics. In addition, relevant MEPS+ data on incoming messages, transaction details, account positions and member positions are analysed using an automated utility.

2.4 **Core Principle IV**

The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day

2.4.1 This core principle relates to promptness of settlement of the payment transfers through the payment system on the intended day of value.

2.4.2 MEPS+ participants are responsible for ensuring that the payment details are correct and there are sufficient funds in their MEPS+ accounts. Payments which fail the validation checks (due to incorrect payment details or message formats) are rejected automatically by MEPS+. Valid payments will be queued for settlement if the participant’s MEPS+ account does not have sufficient liquidity. Participants may cancel or amend the priority of the payments that are queued. Any unsettled payment instruction (due to lack of funds) at the end of day is cancelled.

2.4.3 Settlement in MEPS+ takes place on a continuous real-time basis during MEPS+ operation hours between 9am and 7pm (Mondays to Fridays). In cases where the payment details are correct and the sending participant has adequate funds in its MEPS+ account, the sending and receiving participants’ MEPS+ accounts will be debited and credited simultaneously; and once debited from or credited to such MEPS+ accounts, the payments shall be deemed completed, final, unconditional and irrevocable. The legal basis for the finality and irrevocability of the MEPS+ transactions is provided for in Section 7 of the FNA and Rule 17.1 of the MEPS+ Service Agreement.

2.5 **Core Principle V**

A system in which multilateral netting takes place should, at a minimum be capable of ensuring the timely completion of daily settlements in the
event of an inability to settle by the participant with the largest single settlement obligation

2.5.1 This core principle concerns payment system which uses multilateral netting for settlement of payment transfers and the need to implement controls to address settlement risk.

2.5.2 It is not relevant to MEPS+ which is a real-time gross settlement system wherein payment transfers are settled real-time and with finality.

2.6 Core Principle VI
Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk and little or no liquidity risk

2.6.1 The aim of this core principle is to eliminate or minimize liquidity and credit risk arising from the use of a particular asset to settle payments through a payment system.

2.6.2 All payments in MEPS+ are settled using the available funds in the participants’ accounts maintained in the books of MAS. Settlement asset is hence central bank money.

2.7 Core Principle VII
The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing

2.7.1 Under this core principle, rigorous and comprehensive security policy measures and procedures should be in place to ensure a high degree of operational reliability for the payment system.
Security

2.7.2 MEPS+ complies with MAS-wide IT Security Policy and IT Security Standard documents as well as Singapore BC/DR standard SS507:2004. Since its launch in December 2006, MEPS+ application codes have been reviewed annually by external security consultants. MEPS+ is subject to internal audits and external audits.

2.7.3 MEPS+ runs on a network that is segregated from MAS’ intranet and the internet. Access to MEPS+ is restricted on a need-to basis and users are issued with their individual user ids and passwords to log into the system. Audit trails are created for all log-ins to MEPS+ and security administrators can review these audit logs and follow up on unusual activities.

2.7.4 MEPS+ transactions are formatted according to SWIFT’s standards and secured using standard SWIFT security. In addition, MEPS+ provides for segregation of duties for all transaction-related and administrative functions.

Operational Reliability

2.7.5 MEPS+ operates with a high level of operational reliability, with real-time monitoring of its components and system capacity. Technical operation of MEPS+ is handled by MAS Information Technology Department. A team of well-trained operational staff ensures that the system can be operated safely at all times during the MEPS+ operations hours.

2.7.6 Objective service level measures such as network connectivity are tracked through the monthly SWIFTNet Link and VPN availability reports provided by SWIFT. Daily reports on the settlement times and transaction volumes and values for the RTGS are analysed using an automated utility by MAS.

2.7.7 MEPS+ participants are expected, under Clause 20.1 of the MEPS+ Operating Rules, to have appropriate front-end computer backup and business resumption plans, and that their operational downtime should be no
more than two hours. In the event of a contingency, participants can submit instructions directly to MAS for processing. The procedures are documented in the Operations and Contingency Manual for MEPS+ Participants and Non-Participants available on the MAS website.

2.7.8 Prior to the implementation of each MEPS+ upgrade, MEPS+ undergoes testing by independent test consultants, MAS users and all participants to ensure that the system functionalities continue to meet users’ requirements. In addition, MEPS+ is stress-tested to ensure that it continues to meet its performance and capacity standards. MEPS+’s capacity is scaled to be sufficient to accommodate projected volumes of thrice the daily volume.

Business Contingency Arrangements

2.7.9 MEPS+ operates with a high level of resilience based on a robust and resilient infrastructure. In addition to having redundant infrastructure at the production site to address key hardware failure, a DR site is maintained at a remote location to serve as a backup. The production MEPS+ database is mirrored real-time to the DR site to ensure system availability and continuity. In the event of a severe failure at the production site, MEPS+ is able to resume operations from the DR site in 45 minutes. The procedures are documented in the MEPS+ DR Procedure Manual, which includes detailed procedures and the underlying scripts and commands required to conduct a fail-over to the DR site; and guidelines for specific tasks required for the planning and execution of the reinstatement process.

2.7.10 In the extreme event that both the MEPS+ production and DR sites are rendered inoperable, MAS may activate OCM to enable payments to be settled on a real time gross basis.

2.7.11 MAS conducts annual drills internally, with participants, SWIFT and CLS on the contingency procedures. In 2011, a total of 8 contingency drills were conducted.
2.8  **Core Principle VIII**  
The system should provide a means of making payments that is practical for its users and efficient for the economy

2.8.1 This core principle relates to the procedures established for the continuous harmonization of the payment system functions and services with the needs and requirements of its participants, the adequacy of the pricing policy and the level of cost efficiency.

2.8.2 MEPS+ leverages on the SWIFT IP Network and FIN messages to enable the participants to streamline their operations, increase straight-through processing and reduce costs.

2.8.3 Payments, up to S$1 billion each, can be sent to MEPS+ during its operating hours from 9am to 7pm (Mondays to Fridays). Participants may submit forward-dated transactions up to 14 calendar days in advance, which will only be processed on their value date.

2.8.4 MAS recovers the recurrent maintenance and support costs of MEPS+ from participants through the annual subscription fees which varies according to the banking license type of the participants; and transaction fees which has a time-based component (based on the time the payment is settled) to encourage early settlement.

2.9  **Core Principle IX**  
The system should have objective and publicly disclosed criteria for participation, which permit fair and open access

2.9.1 The main aspects of this core principle concerned the clarity and objectivity of the access criteria and the related procedures, including regular monitoring of fulfilment of the criteria.
2.9.2 MEPS+ has an objective and fair access criteria, as stipulated in Appendix 3 of the MEPS+ Service Agreement, which is publicly available at the MAS website. Access to MEPS+ is open to all banks licensed under the Banking Act and regulated entities of systemic importance that meet MAS’ high prudential standards, such as the Central Depository Pte Ltd and CLS Bank.

2.9.3 Aspiring participants must satisfy intrinsic standards of solvency and liquidity, exhibit a good track record with respect to fulfilment of financial obligations such as the payment of fees and charges, subscribe to SWIFT membership, obtain the necessary hardware, software, systems and capability to send and receive messages from others in the SWIFT network, and maintain an adequate and appropriate level of fault tolerance in the form of DR facilities.

2.9.4 Banks with very low volume of Singapore Dollar interbank payments may choose not to participate directly in MEPS+. Instead, they may appoint another MEPS+ participant as its agent to make interbank payments on its behalf through a private agency agreement.

2.9.5 MAS monitors the continued fulfilment of the access criteria by the MEPS+ participants on an on-going basis.

2.10 **Core Principle X**

The system’s governance arrangements should be effective, accountable and transparent

2.10.1 This core principle highlights the need for the payment system’s governance arrangements to be effective, accountable and transparent.

2.10.2 MAS has implemented an internal governance framework for MEPS+ which provides a clear decision-making process, accountability and transparency. As the system is owned and operated by MAS, there is a distinct separation
between the operations and oversight functions. The Payment Systems Unit, a unit in the Currency Department in MAS, is responsible for the operations of MEPS+. The technical operation of the system is carried out by MAS Information Technology Department. Operational departments in MAS work closely together to achieve MAS’ objectives of safety and efficiency.

2.10.3 The inter-departmental Payment and Settlement Steering Committee (“PSSC”) is responsible for formulating and advising management on policies associated with systemically important payment and settlement systems (“PSS”) and other systems directly linked to them. PSSC makes recommendations relating to PSS policies and projects to MAS management and is the approving authority for operational policies and implementation issues on PSS projects.

2.10.4 The Specialist Risk Department (“SRD”) in MAS performs oversight of MEPS+ to ensure that the system adheres to international standards and that there is adequate risk management and control framework for its system design, operations, processes and rules. SRD is not involved in the MEPS+ operations and does not participate in PSSC.

2.10.5 MEPS+ is also subject to regular internal and external audits.

2.10.6 Participants are informed of the modifications to MEPS+ that affect them. Important decisions are made after consultation with the top ten MEPS+ participants who make up 80% of MEPS+ transactions by volume and value.

2.10.7 MAS disseminates information relating to MEPS+ operations to participants through two main channels: the MAS website and direct communications (forums and emails). Up-to-date statistics on transaction volumes and values as well as notices and important documents such as the MEPS+ user agreements and operations manual are readily available on the MAS website.