



TECHNICAL STANDARDS
FOR
CASHLESS WAGERING SYSTEM
(SINGAPORE)

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Technical Standards for Cashless Wagering System (Singapore)

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Preface

The purpose of this document is to establish the system requirements for the design and operation of a Cashless Wagering System (CWS) in the gaming industry in Singapore and to guide testing and certification bodies on the areas for technical compliance on the CWS. There are two types of CWS, namely the Wagering Account System (WAS) and the Promotional System (PS).

A WAS is characterised as a host system whereby a player maintains an electronic wagering account on the WAS host database. Funds may be added to the player's wagering account via a cashier station or any supporting kiosk (through the insertion of coins, vouchers or bills). Funds may also be added by any supporting gaming machines through credits won, the insertion of vouchers or bills. The account value can be reduced either through debit transactions, in smaller amounts at a gaming machine or by cashing out at a cashier's cage. Once play is completed the player may have the option to move some of the credits back to the player's account or cash out some credits.

A PS is comprised of gaming machines that are configured to participate in electronically communicated promotional award payments from a host system, and the host system that controls the promotional award issuance parameters. Promotional awards are transferred via the player's promotional account to the gaming machine. Promotional awards can be based on predefined criteria that do not require patron or gaming machine activity prior to redemption and are generally single instance use or based on predefined patron activity criteria that are tied to a specific patron/account.

For both types of systems, a casino will provide the player a secure means of accessing the wagering/promotional accounts via the gaming machines. This is not limited to the issuing of a unique magnetic card and Personal Identification Number (PIN) in conjunction with the accounts on the system databases. Both types of accounts can be accessed via a common mechanism (e.g. same card and PIN) provided that all transactions and balances in both accounts are segregated and accurately accounted for.

In this document, the term "Cashless Wagering System (CWS)" shall be used to refer to both the Wagering Account System (WAS) and the Promotional System (PS).

The intent of this document is to ensure the CWS operates in a manner that is:-

- a. Honest;
- b. Secure;
- c. Reliable; and
- d. Auditable.

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It is not the intent of this document to:-

- a. Mandate a single solution or method to realise an objective;
- b. Limit technology application to gaming equipment;
- c. Limit creativity and variety of choice;
- d. Limit any supplier or manufacturer of equipment;
- e. Preclude research and development into new technologies equipment or innovative ideas.

As far as possible, this document specifies what the minimum technical requirements for CWS are instead of how the requirements should be met; nor try to mandate a particular solution or method as the means to realise the requirements.

Casino Regulatory Authority of Singapore (CRA) is the regulatory authority that supervises and regulates the activities of casinos in Singapore. Casino operators are required to be licensed by law and their CWS shall comply with the technical requirements stated in this document as part of their licensing requirements.

Where applicable, the provisions in the Casino Control Act (Cap. 33A) and its subsidiary legislations shall take precedence over the technical standards.

This document would be reviewed on an ongoing basis to take into account the evolution of systems security and development of other casino related technologies that may require technical regulation.

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1. INTRODUCTION

1.1 Purpose

1.1.1 The purpose of this document is to:-

- a. Create a set of technical standards that would ensure that the operation of the Cashless Wagering System (CWS) in Casinos under Singapore's jurisdiction is secure, reliable and auditable;
- b. Establish the minimum systems integrity standards for CWS;
- c. Eliminate subjective criteria in analysing and certifying CWS operation;
- d. Construct a set of technical standards that is technology neutral wherever feasible; and
- e. Construct a set of technical standards that does not specify or approve any particular method or algorithm. The intent being to allow a wide range of methods to be used to conform to the standards as long as the methods are secure, reliable and consistent with the technology best practices of the day.

1.2 Scope

1.2.1 The scope of this set of technical standards covers:-

- a. The minimum standards required in the operation of the Cashless Wagering System (CWS) so that security, reliability and integrity of the system are achieved; and
- b. The player interface modules to the electronic gaming machines for the purpose of facilitating cashless transactions.

1.2.2 The scope of this set of technical standards does not cover:-

- a. Bonusing system which provides designated gaming machines with additional features that entitle players to special bonus awards (in addition to those described on the payable), based on events triggered by the gaming machines.
- b. Electronic Funds Transfer, which refers to the electronic transfer of cashable credits from a financial institution to a game or gaming machine through the CWS; and
- c. Ticket In – Ticket Out (TITO) function as it shall be interpreted as a component of the Slot Management System.

1.3 Terminology

1.3.1 The following terminology used in this document is to be interpreted as follows:-

- a. Shall: The guideline defined is a mandatory requirement, and therefore must be complied with;
- b. Should: The guideline defined is a recommended requirement. Non-compliance shall be documented and approved by the management. Where appropriate, compensating controls shall be implemented; and
- c. May: The guideline defined is an optional requirement. The implementation of this guideline is determined by the operator's environmental requirements.

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1.4 Definition of Terms

Authority/ The CRA	The Casino Regulatory Authority of Singapore
Critical Data	Memory locations storing data at minimum relating to:- a. Account balances; b. Wagering/Promotional account personal identification numbers (PIN); and c. Wagering/Promotional transaction details.
Critical Memory	Memory locations storing information that is considered vital for the continued proper operation of the gaming machine.
Kiosk	A machine connected to the CWS. It is used for deposits/withdrawals of cash or cash equivalents via the player's wagering account, and for redemption of promotional credits for the player's promotional account (if applicable) through the player's card with PIN entry or other secured means. It accepts coins, vouchers or bills for the addition of funds to player's wagering account.
Meter	A "meter" may be any of the following:- a. A hard meter. The meter can only be incremented. Meter incrementing can only be performed by the gaming equipment's computer. The meter is read by human inspection of the meter display; or b. A storage area within some form of computer memory (e.g. disk or RAM) into which the computer's software is programmed to store and update the current count of the metered quantity.
Player Interface Module	A component (or group of components) housed within the gaming machine cabinet that functions as an interface between the player and the CWS. For example— card readers, key pads, displays, biometric and other input devices.
Promotional Account	An electronic ledger for a PS patron account where the following types of transactions are recorded:- a. Redemptions of promotional credits at a designated area of accountability; b. Promotional account transfers to and from gaming machines; and c. Promotional account adjustments.
SMS	The Slot Management System in the casino operator's Gaming Network.
TITO	Ticket In – Ticket Out System which validates vouchers printed

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	out by gaming machines; the vouchers can either be redeemed for cash, or inserted for play into other gaming machines that support this mechanism.
Wagering Account	An electronic ledger for a WAS patron deposit account where the following types of transactions are recorded:- a. Deposits and withdrawals of cash or cash equivalents at a designated area of accountability; b. Wagering account transfers to and from gaming machines; and c. Wagering account adjustments.
Wagering Account Transfer (WAT)	A transfer of funds between a wagering account and a gaming machine.

1.5 Testing

1.5.1 Testing of the CWS by Approved Test Service Providers (ATSPs) shall be aimed at determining compliance with the technical requirements provided in this document. Areas of non-compliance shall be reported in the test/certification report. Where, in the opinion of the ATSP, the technical requirements spelt out in this document are insufficient, inappropriate or not pertinent to the design and operation of the CWS, the ATSP shall seek direction and further clarification from the Authority before proceeding to testing/certification.

1.6 Consistency of Interpretation

1.6.1 The Casino Regulatory Authority (CRA) of Singapore recognises that the technical standards may be subject to different interpretations by systems vendors, casino operators and ATSPs. As such, any feedback where different interpretations may be applied to the technical standards provided in this document should be directed to the CRA for clarification when it arises.

2. MONITORING REQUIREMENTS

2.1 Machine Identification

- 2.1.1 Each kiosk connected to a CWS shall be uniquely identified by the CWS. This includes kiosks that are connected to the CWS through a gateway or kiosk server.
- 2.1.2 The CWS shall also provide a function to uniquely identify a gaming machine with cashless capability.

2.2 Metering

- 2.2.1 All meters related to cashless transactions between the CWS and gaming machines shall be stored in the gaming machines' critical memory in compliance with the soft meters requirements stipulated in the 'Technical Standards for Electronic Gaming Machines (Singapore) Section 3.2'.

3. CWS SYSTEM REQUIREMENTS

3.1 System Integrity

- 3.1.1 The operational and system control of the CWS shall be administered in accordance with the relevant Internal Control procedures.
- 3.1.2 All critical data communications associated with monetary player balances and affecting revenue shall be encrypted for secure communication purposes.
- 3.1.3 The encryption algorithm shall be demonstrably secured against cryptanalytic attacks.
- 3.1.4 The CWS shall be designed and developed to provide assurance of data accuracy and integrity. There shall be:-
 - a. Input data validation controls to ensure that input data is correct and appropriate;
 - b. Processing controls to detect errors in the completeness and accuracy of the processing and update of system; and
 - c. Output data controls to ensure the accuracy of information being output or reported.
- 3.1.5 The integrity of the CWS software shall be maintained during live use.
- 3.1.6 The CWS shall detect and prevent any alteration of any critical data stored, unless the change is made by an authorised, logged personnel, with all the changes and reasons recorded.
- 3.1.7 All PINs shall be encrypted in CWS host database.
- 3.1.8 Role Based Access Control which users are allowed access to only programs and menu items related to their job functions shall be supported.
- 3.1.9 All software for all the components of the CWS shall be maintained under an appropriate software version control system or mechanism.
- 3.1.10 All changes to the CWS software shall be authorised by CRA before they are implemented.
- 3.1.11 The CWS shall provide functionality that will allow:-
 - a. An account to be automatically locked when a specified number of unsuccessful PIN attempts has been exceeded;
 - b. A card to be flagged as a lost card, and report an attempt to use a lost card;
 - c. An action of invalidating accounts followed by transferring the balances into new accounts to be automatically detected and reported;
 - d. (For WAS) Limits for maximum wagering activity to be set for each account; and
 - e. (For PS) The configuration of promotional parameters to be conducted under proper user role establishment, specific password and audit trail control.

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- 3.1.12 All changes to parameters that may impact promotion redemption frequency or amount, shall be logged, indicating:-
- a. Who made the change;
 - b. The altered parameter;
 - c. The time and date of change;
 - d. The parameter value before and after the change; and
 - e. The reason for parameter adjustment.

3.2 Operational Requirements for Data Protection, Recovery and Retention

- 3.2.1 The CWS database shall be stored on redundant media so that no single failure of any portion of the system would cause the loss or corruption of data.
- 3.2.2 In the event of a system failure, the database shall be reloaded from the last backup point and all data up to the minute of failure shall be fully recovered through roll forward of transaction logs.
- 3.2.3 All CWS data shall be held and be able to be accessed or retrieved for a period of five (5) years (from back-ups or archives acceptable).

3.3 Physical Security

- 3.3.1 The CWS programs and database shall be hosted in a secure area where only authorised personnel may enter.
- 3.3.2 Physical access controls shall be in place to monitor the entry of personnel into the CWS hosting environment so as to prevent and detect unauthorised entry attempts.
- 3.3.3 Adequate environment controls shall be implemented to manage the risk against possible environmental exposure such as power failures, flooding and fires at the location where the CWS is hosted.

3.4 Events

Diagnostic Activity

- 3.4.1 For any CWS related diagnostic activity performed on gaming machines/kiosks, the specific account(s), the individual(s) and the diagnostic activities shall be logged.

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Event Search

- 3.4.2 The CWS shall provide an online search facility that enables comprehensive searching of the event log for all pending, completed and failed cashless transactions for at least the previous thirty (30) days of data. The search facility shall have the ability to perform a search based at least on the following:-
- a. Date and Time range;
 - b. Unique gaming machine/kiosk identification number; and
 - c. Patron's wagering/promotional account information.
- 3.4.3 The CWS shall also provide an online search facility that enables comprehensive searching of the event log for non-transactional failure events for at least the previous thirty (30) days. The failure events include but are not limited to:-
- a. Account authentication failure;
 - b. Power reset or failure of any component of the CWS; and
 - c. Communication loss between the gaming machine and any component of the CWS.

3.5 Reporting Requirements

- 3.5.1 The CWS shall be able to create all the financial reconciliation and variance reports as well as all Internal Controls required reports as stipulated in CRA "Casino Reporting Requirements for Operators" document.

4. CWS SYSTEM COMPONENT REQUIREMENTS

4.1 Player Account

- 4.1.1 After the confirmation of player's identity through secured authentication means, the player interface module shall at minimum allow the transfer of a pre-configured amount from the player account to the gaming machine.
- 4.1.2 Cashless transactions shall be entirely electronic. Players shall be able to:-
 - a. (For WAS) Remove funds from their wagering account through electronic credits transfer to the gaming machine they are playing;
 - b. (For WAS) Add funds to their wagering account through electronic credits transfer from the gaming machine after the game is finished;
 - c. (For PS) Remove promotional credits from their promotional account through electronic credits transfer to the gaming machine they are playing; and
 - d. (For PS) Return remaining promotional credits to their promotional account through electronic credits transfer from the gaming machine after the game is finished.
- 4.1.3 Current wagering/promotional account balance information should be available on demand from any participating gaming machine via the player interface module after confirmation of patron identity and be presented to the patron.
- 4.1.4 If cashable and non-cashable credits are combined to a single credit meter at the gaming machine, the CWS shall apply all non-cashable credits to a player's wagering activity before applying any cashable credits.

4.2 Interface Security

- 4.2.1 Each gaming machine interfaced with a CWS using a player interface module shall have the interface module installed inside a secure area of the gaming machine and shall employ a secure communication method between the interface module and the CWS.
- 4.2.2 All patrons' access to the wagering/promotional account shall be secured either by card insertion into a magnetic card reader attached to the gaming machine with PIN entry or by other protected means.
- 4.2.3 Any device in the player interface module that holds information, relating to events and cashless transactions in its memory shall not have means to compromise the information and shall not allow the removal of its information unless it has transferred that information to the CWS host.

4.3 Data Integrity of Card

- 4.3.1 It is permissible for the CWS to allow players to access their wagering accounts using “Smart Card” technology where the account information, including the current balance, is maintained in the CWS host database. Some “Smart Cards” have the ability to maintain a player account balance. This method of technology is only permissible when CWS host validates that the amount on the card is in agreement with the amount stored with the system’s database.

4.4 System Clock

- 4.4.1 The CWS shall synchronise its internal clock with the same time source as that of the SMS. The time source shall accurately reflect the current time (in hours, minutes and seconds) and date that shall be used to time-stamp all logged information in the CWS.

5. DISPLAY AND COMMUNICATIONS REQUIREMENTS

5.1 Cashless Transaction Display Information

- 5.1.1 The player interface module shall be capable of providing confirmation/denial of every cashless transaction initiated. This confirmation/denial shall include:-
- a. The type of transaction (WAT/Cashable/Non-Cashable Electronic Promotion In or WAT/Cashable/Non-Cashable Electronic Promotion Out);
 - b. The transaction value;
 - c. The time and date;
 - d. The player's account number or a unique Transaction Number; and
 - e. A descriptive message as to why the transaction did not complete as initiated.
- 5.1.2 A message describing the type of error shall be displayed to the patron at the player interface module in the event of the following error conditions:-
- a. Invalid PIN (Can prompt for re-entry up to maximum allowed); and
 - b. Unknown account.
- 5.1.3 If a player initiates a cashless transaction and that transaction would exceed game configured limits (i.e. the credit limit, etc) then this transaction shall only be processed provided that the patron is clearly notified that he has received or deposited less than requested to avoid patron disputes.
- 5.1.4 The PS shall notify the player when promotional awards are awarded. Any conditions, such as promotion expiration, shall also be made known to the player.

5.2 Communication

- 5.2.1 If communication between the CWS and the gaming machine is lost, the gaming machine or player interface module shall display a message to the player that transactions cannot currently be processed.
- 5.2.1A If communication between the CWS and the kiosk is lost, the kiosk shall display a message to the patron that transactions cannot currently be processed.
- 5.2.2 In the event of communication breakdown between the gaming machine/kiosk and CWS, the gaming machine/kiosk shall:-
- a. Not transfer any credits from the CWS host to the gaming machine; and
 - b. Not transfer any credits on the gaming machine to the CWS host. If this is the only available payout medium, it shall result in a hand-pay lockup or tilt on the gaming machine.

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- 5.2.3 When a malfunction in the operation of the CWS occurs, an appropriate error message shall be made visible to the players at the player interface module of the affected gaming machines and shall alert the casino to the error condition.