GLI STANDARD SERIES

GLI-19:

STANDARDS FOR INTERACTIVE GAMING SYSTEMS

VERSION: 3.0

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About This Standard

Gaming Laboratories International, LLC (GLI) has developed this technical standard for the purpose of providing independent technical analysis and/or certifications to gaming industry stakeholders indicating the state of compliance for gaming operations and systems with the requirements set forth herein.

Operators and suppliers are expected to provide documentation, credentials, and associated access to a production equivalent test environment with a request to the independent testing laboratory that it be evaluated in accordance with this technical standard. Upon the successful completion of testing, the independent testing laboratory will provide a certificate of compliance evidencing the certification to this standard.

GLI-19 should be viewed as a living document that will be tailored periodically to align with this developing industry over time as gaming implementations and operations evolve.

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Chapter 1: Introduction to Interactive Gaming Systems

1.1 Introduction

1.1.1 General Statement

Gaming Laboratories International, LLC (GLI) has been testing gaming equipment since 1989. Over the years, GLI has developed numerous technical standards utilized by jurisdictions all over the world. This document, *GLI-19*, sets forth the technical standards for Interactive Gaming Systems.

1.1.2 Document History

This document is a compilation based upon many standards documents from around the world. Some were written by GLI; others were written by industry regulators with input from independent test laboratories and Interactive Gaming System operators, developers, and suppliers. GLI has taken each of the standards documents and merged the unique rules, eliminated some rules and updated others, to reflect both the change in technology and the purpose of maintaining an objective standard that achieves common regulatory objectives without unnecessarily impeding technological innovation. GLI lists below, and gives credit to, agencies whose documents were reviewed prior to writing this Standard. It is the policy of GLI to update this document as often as warranted to reflect changes in technology and/or testing methods. This document will be distributed without charge and may be obtained by downloading it from the GLI website at www.gaminglabs.com or by contacting GLI at:

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1.2 Acknowledgment of Other Standards Reviewed

1.2.1 General Statement

This technical standard has been developed by reviewing and using portions of documents from the following organizations. GLI acknowledges and thanks the regulators and other industry participants who have assembled these documents:

a) Nevada Gaming Commission and Gaming Control Board.
b) British Columbia Gaming Policy and Enforcement Branch (GPEB).
c) Tasmanian Liquor and Gaming Commission.
d) Danish Gambling Authority.
e) Spanish Directorate General for the Regulation of Gambling (DGOJ).
f) Alderney Gambling Control Commission.

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g) Lottery and Gaming Authority, Malta.
h) United Kingdom Gambling Commission.
i) World Lottery Association (WLA).

1.3 Purpose of Technical Standards

1.3.1 General Statement

The purpose of this technical standard is as follows:

a) To eliminate subjective criteria in analyzing and certifying Interactive Gaming Systems.
b) To test the criteria that impact the credibility and integrity of Interactive Gaming Systems from both the revenue collection and player's perspective.
c) To create a standard that will ensure interactive gaming is fair, secure, and able to be audited and operated correctly.
d) To distinguish between local public policy and Independent Test Laboratory criteria. It is up to each local jurisdiction to set its own public policy with respect to gaming.
e) To recognize that the evaluation of internal control systems (such as Anti-Money Laundering, Financial and Business processes) employed by the operators of the Interactive Gaming System should not be incorporated into the laboratory testing of the standard but instead be included within the operational audit performed for local jurisdictions.
f) To construct a standard that can be easily revised to allow for new technology.
g) To construct a standard that does not specify any particular design, method, or algorithm. The intent is to allow a wide range of methods to be used to conform to the standards, while at the same time encourage new methods to be developed.

1.3.2 No Limitation of Technology

One should be cautioned that this document shall not be read in such a way that limits the use of future technology. This document should not be interpreted to mean that if the technology is not mentioned, then it is not allowed. To the contrary, GLI will review this standard and make changes to incorporate minimum standards for any new and related technology.

1.3.3 Adoption and Observance

This technical standard can be adopted in whole or in part by any regulatory body that wishes to implement a comprehensive set of requirements for Interactive Gaming Systems.

1.4 Other Documents That May Apply

1.4.1 Other GLI Standards

This technical standard covers the requirements for Interactive Gaming Systems. Depending on the technology utilized by a system, additional GLI technical standards may also apply.

NOTE: The entire family of GLI Standards is available free of charge at www.gaminglabs.com.

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1.4.2 Minimum Internal Control Standards (MICS)

The implementation of an Interactive Gaming System is a complex task, and as such will require the development of internal processes and procedures to ensure that the system is configured and operated with the necessary level of security and control. To that end, it is expected that a set of Minimum Internal Control Standards (MICS) will be established to define the internal processes for the management and handling of games as well as the requirements for internal control of any system or component software and hardware, and their associated accounts.

1.5 Interpretation of this Document

1.5.1 General Statement

This technical standard applies to systems that support interactive gaming and is intended to be general in nature and not limit or authorize specific game types and functionalities. The intent is to provide a framework to cover those currently known and permitted by law. This document is not intended to define which parties are responsible for meeting the requirements of this technical standard. It is the responsibility of the stakeholders of each operator to determine how to best meet the requirements laid out in this document.

NOTE: This technical standard does NOT apply to systems that support wagering on sports, competitions, matches, and other event types using an Event Wagering System. For detailed standards applicable to these systems, please reference the *GLI-33 Standards for Event Wagering Systems*.

1.5.2 Software Suppliers and Operators

The components of an Interactive Gaming System, although they may be constructed in a modular fashion, are designed to work seamlessly together. In addition, Interactive Gaming Systems may be developed to have configurable features; the final configuration of which depends on the options chosen by the operator. From a testing perspective, it might not be possible to test all of the configurable features of an Interactive Gaming System submitted by a software supplier in the absence of the final configuration chosen by the operator; however, the configuration that will be utilized in the production environment shall be communicated to the independent test laboratory to facilitate creating a functionally equivalent test environment. Because of the integrated nature of an Interactive Gaming System, there are several requirements in this document which may apply to both operators and suppliers. In these cases, where testing is requested for a "white-label" version of the system, a specific configuration will be tested and reported.

1.6 Testing and Auditing

1.6.1 Laboratory Testing

The independent test laboratory will test and certify the components of the Interactive Gaming System in accordance with the chapters of this technical standard within a controlled test environment, as applicable. Any of these requirements which necessitate additional operational

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procedures to meet the intent of the requirement shall be documented within the evaluation report and used to supplement the scope of the operational audit.

1.6.2 Operational Audit

The integrity and accuracy of the operation of an Interactive Gaming System is highly dependent upon operational procedures, configurations, and the production environment's network infrastructure. As such, an operational audit is an essential addition to the testing and certification of an Interactive Gaming System. The operational audit, outlined within the following appendices of this technical standard, shall be performed at a frequency specified by the regulatory body:

a) Appendix A: Operational Audit for Gaming Procedures and Practices. This includes, but is not limited to, review of the internal controls, procedures and practices for gaming operations, including, but not limited to establishing gaming rules, managing games, handling various gaming and financial transactions, creating and managing progressive jackpots, creating and managing incrementing jackpots, player account management, fundamental practices relevant to the limitation of risks, and any other objectives established by the regulatory body.
b) Appendix B: Operational Audit for Technical Security Controls. This includes, but is not limited to, a review of the operational processes that are critical to compliance, penetration testing focused on the external and internal infrastructure as well as the applications transferring, storing and/or processing of personally identifiable information (PII) and/or other sensitive information, and any other objectives established by the regulatory body.
c) Appendix C: Operational Audit for Service Providers. This includes the assessment of providers of particular services, which may be offered directly by the operator or involve the use of third-party service providers, including, but not limited to evaluation of information security services, cloud services, payment services (financial institutions, payment processors, etc.), location services, live game services, and any other services which may be offered directly by the operator or involve the use of third-party service providers.

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Chapter 2: Platform/System Requirements

2.1 Introduction

2.1.1 General Statement

If the Interactive Gaming System is comprised of multiple computer systems at various sites, the system as a whole and all communication between its components shall conform to the applicable technical requirements within this document.

2.2 System Clock Requirements

2.2.1 System Clock

The Interactive Gaming System shall maintain an internal clock that reflects the current date and time that shall be used to provide for the following:

a) Time stamping of all transactions and games;
b) Time stamping of significant events; and
c) Reference clock for reporting.

2.2.2 Time Synchronization

The Interactive Gaming System shall be equipped with a mechanism to ensure the time and dates between all components that comprise the system are synchronized and set correctly.

2.3 Control Program Requirements

2.3.1 General Statement

In addition to the requirements contained within this section, the "Verification Procedures" section of this document shall also be met.

2.3.2 Control Program Self-Verification

The Interactive Gaming System shall be capable of verifying that all critical control program components contained on the system are authentic copies of the approved components of the system, at least once every twenty-four hours and on demand using a method approved by the regulatory body. The critical control program authentication mechanism shall:

a) Employ a cryptographic hash algorithm which produces a message digest of at least 128 bits. Other test methodologies shall be reviewed on a case-by-case basis;
b) Include all critical control program components which may affect gaming operations, including but not limited to executables, libraries, gaming or system configurations, operating system files, components that control required system reporting, and database elements that affect

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system operations; and
c) Provide an indication of the authentication failure if any critical control program component is determined to be invalid.

2.3.3 Control Program Independent Verification

Each critical control program component of the Interactive Gaming System shall have a method to be verified via an independent third-party verification procedure. The third-party verification process shall operate independently of any process or security software within the system. The independent test laboratory, prior to system approval, shall evaluate the integrity check method.

2.4 Gaming Management

2.4.1 Gaming Management

The Interactive Gaming System shall be able to disable the following on demand:

a) All gaming activity;
b) Individual game themes/paytables or versions (e.g., desktop, mobile, tablet, etc.); and
c) Individual player logins.

2.4.2 Changes to Jackpot Parameters

The following requirements apply to modifying progressive jackpot or incrementing jackpot parameter values once the current jackpot's payoff has already had player contributions to it and without requiring it to be decommissioned:

a) For jackpots with a configurable increment rate which affects the return to player (RTP) of the game(s), changes to the increment rate may not take effect until the current jackpot is won;
b) For jackpots with a configurable ceiling which does not affect the RTP of the game(s), changes to the ceiling may only be to a value greater than the current payoff. Alternatively, changes to the ceiling may not take effect until the current jackpot is won;
c) Changes to the parameters shall not affect the probabilities of triggering the current jackpot;
d) For mystery-triggered jackpots which use a hidden trigger amount to determine the jackpot win:
    i. The hidden trigger amount shall be reselected when modifying any parameters that could result in an immediate trigger due to the modification; and
    ii. The reselected amount shall be in the range of the current payoff to the ceiling and shall not result in a trigger without any contribution after the modification.

2.4.3 Jackpot Modifications

The Interactive Gaming System shall contain a secure means for transferring or combining contributions from a decommissioned jackpot (and any overflow or diversion pools specific to that jackpot), correcting errors with a jackpot, or any other reasons required by the regulatory body.

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2.5 Player Account Management

2.5.1 General Statement

Player account registration and verification are required by the Interactive Gaming System for a player to participate in interactive gaming. In addition to the requirements contained within this section, the "Player Account Controls" section of this document shall also be met.

2.5.2 Registration and Verification

There shall be a method to collect player's personally identifiable information (PII) prior to the registration of a player account. Where player account registration and verification are supported by the Interactive Gaming System either directly by the system or in conjunction with a third-party service provider's software, the following requirements shall be met:

a) Only players of the legal gaming age for the jurisdiction may register for a player account. During the registration process, the player shall:
   i. Be denied the ability to register for a player account if they submit a birth date which indicates that they are underage;
   ii. Be informed on the registration form which information fields are "required", which are not, and what will be the consequences of not filling in the required fields;
   iii. Agree to the terms and conditions and privacy policy:
   iv. Acknowledge that they are prohibited from allowing any unauthorized person to access or use their player account;
   v. Consent to the monitoring and recording of the use of their player account by the operator and the regulatory body; and
   vi. Affirm that the PII the player is providing to open the player account is accurate.
b) Identity verification shall be undertaken before a player is allowed to play a game. Third-party identity verification service providers may be used for identity verification as allowed by the regulatory body.
   i. Identity verification shall authenticate the legal name, residential address, and date of birth of the individual at a minimum as required by the regulatory body.
   ii. Identity verification shall also confirm that the player is not on any exclusion lists held by the operator or the regulatory body or prohibited from establishing or maintaining an account for any other reason.
   iii. Details of identity verification shall be kept in a secure manner.
c) The player account can only become active once age and identity verification are successfully completed, the player is determined to not be on any exclusion lists or prohibited from establishing or maintaining an account for any other reason, the player has acknowledged the necessary terms and conditions and privacy policy, and the player account registration is complete.
d) A player shall only be permitted to have one active player account at a time unless specifically authorized by the regulatory body.
e) The system shall allow the ability to update authentication credentials, registration information and the account used for financial transactions for each player. A multi-factor authentication process shall be employed for these purposes.

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2.5.3 Player Access

A player accesses their player account using authentication credentials, such as a username (or similar) and a password or a secure alternative means, for the player to perform authentication to log in to the Interactive Gaming System from a specific Remote Player Device. Allowable authentication credentials are subject to the discretion of the regulatory body as necessary. The requirement does not prohibit the option for more than one method of authentication being available for a player to access their account.

a) If the system does not recognize the authentication credentials when entered, an explanatory message shall be displayed to the player which prompts the player to try again. The error message shall be the same regardless of which authentication credential is incorrect.
b) Where a player has forgotten their authentication credentials, a multi-factor authentication process shall be employed for the retrieval or reset of their forgotten authentication credentials.
c) Current account balance information, including any incentive credits, and transaction options shall be available to the player once authenticated. All restricted incentive credits and incentive credits that have a possible expiration shall be indicated separately.
d) The system shall support a mechanism that allows for an account to be locked in the event that suspicious activity is detected, such as three consecutive failed access attempts in a thirty-minute period. A multi-factor authentication process shall be employed for the account to be unlocked.

NOTE: Where passwords are used as an authentication credential, it is recommended that they are at least eight characters in length.

2.5.4 Player Inactivity

After thirty minutes of inactivity on that Remote Player Device, or a period determined by the regulatory body, the player shall be required to re-authenticate to access their player account.

a) No further games or financial transactions on that device are permitted until the player has been re-authenticated.
b) A simpler means may be offered for a player to re-authenticate on that device, such as operating system-level authentication (e.g., biometrics) or a Personal Identification Number (PIN). Each means for re-authentication will be evaluated on a case-by-case basis by the independent test laboratory.
    i. This functionality may be disabled based on preference of the player and/or regulatory body.
    ii. Once every thirty days, or a period specified by the regulatory body, the player will be required to provide full authentication on that device.

2.5.5 Limitations and Exclusions

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The Interactive Gaming System shall be able to correctly implement any limitations and/or exclusions put in place by the player and/or operator as required by the regulatory body:

a) Where the system provides the ability to directly manage limitations and/or exclusions, the applicable requirements within the "Limitations" and "Exclusions" sections of this document shall be evaluated;
b) The self-imposed limitations set by a player shall not override more restrictive operator-imposed limitations. The more restrictive limitations shall take priority; and
c) Limitations shall not be compromised by internal status events, such as self-imposed exclusion orders and revocations.

2.5.6 Financial Transactions

Where financial transactions can be performed automatically by the Interactive Gaming System the following requirements shall be met:

a) The system shall provide confirmation/denial of every financial transaction initiated, including
   i. The type of transaction (deposit/withdrawal);
   ii. The transaction value; and
   iii. For denied transactions, a descriptive message as to why the transaction did not complete as initiated.
b) A deposit into a player account may be made via a debit instrument transaction, credit card transaction, or other methods which can produce a sufficient audit trail.
c) Funds shall not be available for wagering until they are received from the issuer or the issuer provides an authorization number indicating that the funds are authorized. The authorization number is to be maintained in an audit log.
d) Payments from an account are to be paid (including funds transfer) directly to an account with a financial institution in the name of the player or made payable to the player and forwarded to the player's address using a secure delivery service or through another method that is not prohibited by the regulatory body. The name and address are to be the same as held in player registration details.
e) If a player initiates a financial transaction and that transaction would exceed limits put in place by the operator and/or regulatory body, this transaction may only be processed provided that the player is clearly notified that they have withdrawn or deposited less than requested.
f) It shall not be possible to transfer funds between two player accounts.

2.5.7 Transaction Log or Account Statement

The Interactive Gaming System shall be able to provide a transaction log or account statement history to a player upon request. The information provided shall include sufficient information to allow the player to reconcile the statement or log against their own financial records. Information to be provided shall include at a minimum, details on the following types of transactions within the past year or other time period as requested by the player or as required by the regulatory body:

a) Financial Transactions (time stamped with a unique transaction ID):
   i. Deposits to the player account;

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ii. Withdrawals from the player account;
iii. Incentive credits added to/removed from the player account (outside of credits won in a game);
iv. Manual adjustments or modifications to the player account (e.g., due to refunds);
v. Any non-wager purchases (if applicable);

b) Game History (by game theme);
i. The name of the game theme and game type (reel, blackjack, poker, table, etc.);
ii. Total amount wagered, including any incentive credits (if applicable); and
iii. Total amount won for completed games, including, any incentive credits and/or prizes, and any progressive jackpots and/or incrementing jackpots (if applicable).

2.5.8 Player Loyalty Programs

Player loyalty programs are any programs that provide incentive awards for players, typically based on the volume of play or revenue received from a player. If player loyalty programs are supported by the Interactive Gaming System, the following principles shall apply:

a) All awards shall be equally available to all players who achieve the defined level of qualification for player loyalty points;
b) Redemption of player loyalty points earned shall be a secure transaction that automatically debits the points balance for the value of the prize redeemed; and
c) All player loyalty points transactions shall be recorded by the system.

2.6 Player Software

2.6.1 General Statement

Player Software is used to take part in games and financial transactions with the Interactive Gaming System which, based on design, is downloaded to or installed on the Remote Player Device, run from the Interactive Gaming System which is accessed by the Remote Player Device, or a combination of the two.

2.6.2 Software Identification

Player Software shall contain sufficient information to identify the software and its version.

2.6.3 Software Validation

For Player Software installed locally on the Remote Player Device, it shall be possible to authenticate that all critical software components are valid each time the software is loaded for use, and where supported by the system, on demand as required by the regulatory body. Critical software components may include, but are not limited to, gaming rules, pay table information, elements that control the communications between the Remote Player Device and the Interactive Gaming System, or other software components that are needed to ensure proper operation of the software. In the event of a failed authentication (i.e., program mismatch or authentication failure), the software shall prevent gaming operations and display an appropriate error message.

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NOTE: Program verification mechanisms will be evaluated on a case-by-case basis and approved by the regulatory body and the independent test laboratory based on industry-standard security practices.

2.6.4 Communications

Player Software shall be designed or programmed such that it may only communicate with authorized components through secure communications. If communication between the Interactive Gaming System and the Remote Player Device is lost, the software shall prevent further gaming operations and display an appropriate error message. It is permissible for the software to detect this error when the device tries to communicate with the system.

2.6.5 Client-Server Interactions

The player may obtain/download an application or software package containing the Player Software or access the software via a browser to take part in gaming and financial transactions with the Interactive Gaming System.

a) Players shall not be able to use the software to transfer data to one another, other than chat functions (e.g., text, voice, video, etc.) and approved files (e.g., user profile pictures, photos, etc.);
b) The software shall not automatically disable any virus scanners and/or detection programs or alter any device-specified firewall rules to open ports that are blocked by either a hardware or software firewall;
c) The software shall not access any TCP/UDP ports (either automatically or by prompting the user to manually access) which are not necessary for the communication between the Remote Player Device and the server;
d) If the software includes additional non-gaming related functionality, this additional functionality shall not alter the software's integrity in any way;
e) The software shall not possess the ability to override the volume settings of the Remote Player Device;
f) The software shall not be used to store sensitive information. It is recommended that auto complete, password caching, or other methods that will fill in the password field are disabled by default for the software; and
g) The software shall not contain any logic utilized to generate the result of any game. All critical functions including the generation of any game outcome shall be generated by the Gaming Platform and be independent of the Remote Player Device.

2.6.6 Compatibility Verification

During any installation or initialization and prior to commencing gaming operations, the Player Software used in conjunction with the Interactive Gaming System shall detect any incompatibilities or resource limitations with the Remote Player Device that would prevent proper operation of the software (e.g., software version, minimum specifications not met, browser type, browser version, plug-in version, etc.). If any incompatibilities or resource limitations are detected the software shall prevent gaming operations and display an appropriate error message.

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2.6.7 Software Content

Player Software shall not contain any malicious code or functionality deemed to be malicious in nature by the regulatory body. This includes, but is not limited to, unauthorized file extraction/transfers, unauthorized device modifications, unauthorized access to any locally stored personal information (e.g., contacts, calendar, etc.) and malware.

2.6.8 Cookies

Where cookies are used, players shall be informed of the cookie use upon Player Software installation or during player registration. When cookies are required for gaming, gaming cannot occur if they are not accepted by the Remote Player Device. All cookies used shall contain no malicious code.

2.6.9 Information Access

In addition to the "Game Requirements" within this document, the Player Software shall be able to display, either directly from the player interface or from a page accessible to the player, the items specified in the following sections of this document:

a) "Gaming Rules and Content";
b) "Player Protection Information";
c) "Terms and Conditions"; and
d) "Privacy Policy".

2.7 Location Requirements

2.7.1 General Statement

The requirements within this section shall apply for player location detection. In addition to the requirements contained within this section, the operator or third-party service provider maintaining these components, services and/or applications shall meet the operational procedures and controls indicated in the "Location Services" section of this document.

2.7.2 Location Fraud Prevention

The Interactive Gaming System shall incorporate a mechanism to detect the use of remote desktop software, rootkits, virtualization, and/or any other programs identified as having the ability to circumvent location detection. This shall follow best practice security measures to:

a) Detect and block location data fraud (e.g., fake location apps, virtual machines, remote desktop programs, etc.) prior to initiating each game;
b) Examine the IP Address upon each Remote Player Device connection to a network to ensure a known Virtual Private Network (VPN) or proxy service is not in use;
c) Detect and block devices which indicate system-level tampering (e.g., rooting, jailbreaking, etc.);
d) Stop "Man-In-The-Middle" attacks or similar hacking techniques and prevent code

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manipulation; and
e) Utilize detection and blocking mechanisms verifiable to an application level.

2.7.3 Location Detection on a Private Network

Where interactive gaming occurs over a private network, such as a Wireless Local Area Network (WLAN), the Interactive Gaming System shall incorporate one of the following methods that can track the locations of all players connected to the network:

a) A location detection service or application in which each player shall pass a location check prior to initiating each game. This service or application shall meet the requirements specified in the next section for "Location Detection on a Public Network"; or
b) A location detection component that detects in real-time when any players are no longer in the permitted boundary and prevent further games from being played. This can be accomplished with the use of specific IT hardware such as directional antennas, Bluetooth sensors or other methods to be evaluated on a case-by-case basis by the independent test laboratory.

2.7.4 Location Detection on a Public Network

Where interactive gaming occurs over a public network, such as the internet, the Interactive Gaming System shall incorporate a location detection service or application to reasonably detect and dynamically monitor the location of a player attempting to play a game; and to monitor and enable the blocking of unauthorized attempts to play a game.

a) Each player shall pass a location check prior to initiating the first game after logging in on a specific Remote Player Device. Subsequent location checks on that device shall occur prior to initiating games after detection of a change to the player's IP Address, after a period of thirty minutes since the previous location check, or as otherwise specified by the regulatory body:
    i. If the location check indicates the player is outside the permitted boundary or cannot successfully locate the player, the game shall not initiate, and the player shall be notified of this.
    ii. An entry shall be recorded in a time stamped log any time a location violation is detected, including the unique player ID and the detected location.
b) A geolocation method shall be used to provide a player's physical location and an associated confidence radius. The confidence radius shall be entirely located within the permitted boundary.
c) Accurate location data sources (Wi-Fi, GSM, GPS, etc.) shall be utilized by the geolocation method to confirm the player's location. If a Remote Player Device's only available location data source is an IP Address, the location data of a mobile device registered to the player account may be used as a supporting location data source under the following conditions:
    i. The Remote Player Device (where the game is being played) and the mobile device shall be determined to be near one another.
    ii. If allowed by the regulatory body, carrier-based location data of a mobile device may be used if no other location data sources other than IP Addresses are available.
d) The geolocation method shall possess the ability to control whether the accuracy radius of the location data source is permitted to overlap or exceed defined buffer zones or the permitted

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boundary.

e) To mitigate and account for discrepancies between mapping sources and variances in geospatial data, boundary polygons based on audited maps approved by the regulatory body as well as overlay location data onto these boundary polygons shall be utilized.
f) The geolocation method shall monitor and flag for investigation any games played by a single player account from geographically inconsistent locations (e.g., successive player locations were identified that would be impossible to travel between in the time reported).

2.8 Information to be Maintained

2.8.1 Data Retention and Time Stamping

The Interactive Gaming System shall be capable of maintaining and backing up all recorded data as discussed within this section:

a) The system clock shall be used for all time stamping.
b) The system shall provide a mechanism to export the data for the purposes of data analysis and auditing/verification (e.g., CSV, XLS).

2.8.2 Game Play Information

For each individual game played by the player, the information to be maintained and backed up by the Interactive Gaming System shall include, as applicable:

a) The date and time the game was played;
b) The denomination played for the game, if a multi-denomination game type;
c) The display associated with the final outcome of the game, either graphically or via a clear text description;
d) The funds available for wagering at the start of play and/or at the end of play;
e) Total amount wagered, including any incentive credits;
f) Total amount won, including:
    i. Any incentive credits and/or prizes; and
    ii. Any progressive jackpots or incrementing jackpots;
g) Any non-wager purchase that occurred between the start of play and the end of play;
h) Rake, commission, or fees collected;
i) The results of any player choices involved in the game outcome;
j) The results of any intermediate game phases, such as double-up/gamble or bonus/feature games;
k) If a progressive jackpot and/or incrementing jackpot was won, an indication that the jackpot was awarded;
l) Any player advice that is offered to the player for games with skill;
m) Contributions to progressive jackpots or incrementing jackpots;
n) Relevant location information;
o) The current status of the game (in progress, complete, interrupted, cancelled, etc.);
p) Unique game cycle ID and/or gaming session ID (if different);
q) Unique game theme/paytable ID; and

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r) Unique player ID.

NOTE: For individual games with multiple players, such information shall be recorded for each player.

2.8.3 Game Theme/Paytable Information

For each individual game theme and paytable available for play, the information to be maintained and backed up by the Interactive Gaming System shall include, as applicable:

a) Unique game theme/paytable ID;
b) Game configuration data (e.g., denominations, wager categories, etc.);
c) The date and time the game theme/paytable was made available for play;
d) Theoretical return to player (RTP) percentage;
e) The number of games played;
f) Total value of all wagers, not including:
   i. Any incentive credits wagered; and
   ii. Subsequent wagers of intermediate winnings accumulated during game play such as those acquired from double-up/gamble features;
g) Total value paid as a result of winning wagers, not including:
   i. Any incentive credits and/or prizes won; and
   ii. Any progressive jackpots and/or incrementing jackpots won;
h) Total value paid as a result of progressive jackpots and/or incrementing jackpots won;
i) Total amount of incentive credits wagered;
j) Total amount of incentive credits and/or prizes won;
k) Total amount of wagers voided or cancelled, including any incentive credits;
l) Total amount of non-wager purchases made in relation to the game;
m) The number of times each jackpot is awarded;
n) For games which support double-up/gamble features:
   i. Total double-up/gamble amount wagered;
   ii. Total double-up/gamble amount won;
   iii. Number of double-up/gamble games played;
   iv. Number of double-up/gamble games won;
o) Total rake, commission, or fees collected;
p) The current status of the game theme/paytable (active, disabled, decommissioned, etc.); and
q) The date and time the game theme/paytable was or is scheduled to be decommissioned (blank until known).

2.8.4 Contest/Tournament Information

For Interactive Gaming Systems which support contests/tournaments, the information to be maintained and backed up by the Interactive Gaming System shall include for each contest/tournament, as applicable:

a) Name or identification of the contest/tournament;
b) The date and time the contest/tournament occurred or will occur (if known);
c) Participating game theme/paytable ID(s);

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d) For each registered player:
   i. Unique player ID;
   ii. Amount of entry fee collected, including any incentive credits, and the date collected;
   iii. Player scorings/rankings;
   iv. Amount of winnings paid, including any incentive credits, and the date paid;
e) Total amount of entry fees collected, including any incentive credits;
f) Total amount of winnings paid to players, including any incentive credits;
g) Total rake, commission, or fees collected; and
h) The current status of the contest/tournament (in progress, complete, interrupted, cancelled, etc.).

2.8.5 Player Account Information

For each player account, the information to be maintained and backed up by the Interactive Gaming System shall include:

a) Unique player ID and username (if different);
b) Personally identifiable information (PII) of the player, such as:
   i. The information collected by the operator to register a player and create the account, including, the legal name, residential address, and date of birth;
   ii. Encrypted PII, including the government identification number (social security number, taxpayer identification number, passport number, or equivalent), authentication credential (password, PIN, etc.), and personal financial information (debit instrument numbers, credit card numbers, bank account numbers, etc.);
c) The date and method of identity verification, including, where applicable, a description of the identification credential provided by a player to confirm their identity and its date of expiration;
d) The date of player agreement to the operator's terms and conditions and privacy policy;
e) Account details and current balance, including any incentive credits. All restricted incentive credits and incentive credits that have a possible expiration shall be maintained separately;
f) Previous accounts, if any, and reason for de-activation;
g) The date and method from which the account was registered (e.g., remote vs. on-site);
h) The date and time of account is accessed by any person (player or operator), including IP Address;
i) Exclusions/limitations information as required by the regulatory body:
   i. The date and time of the request (if applicable);
   ii. Description and reason of exclusion/limitation;
   iii. Type of exclusion/limitation (e.g., operator-imposed exclusion, self-imposed deposit limitation);
   iv. The date exclusion/limitation commenced;
   v. The date exclusion/limitation ended (if applicable);
j) Financial transaction information:
   i. Type of transaction (e.g., deposit, withdrawal, adjustment, non-wager purchase);
   ii. The date and time of the transaction;
   iii. Unique transaction ID;
   iv. Amount of transaction;
   v. Total account balance before/after transaction;

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vi. Total amount of fees paid for transaction (if applicable);
vii. User identification which handled the transaction (if applicable);
viii. Transaction status (pending, complete, etc.);
ix. Method of deposit/withdrawal (e.g., cash, personal check, cashier's check, wire transfer, money order, debit instrument, credit card, electronic funds transfer, etc.);
x. Deposit authorization number;
xi. Relevant location information.

k) Persistence game information, if supported by the Interactive Gaming System:
i. Unique game theme/paytable ID, if tied to a particular game theme or paytable;
ii. Game achievements, capabilities earned, or similar;
iii. Last save point, if play from save is supported;

l) Identifier information, if supported by the Interactive Gaming System:
i. Unique game theme/paytable ID, if tied to a particular game theme or paytable;
ii. The date and time of the transaction;
iii. Unique transaction ID;
iv. The criteria for the use of the identifier (skill level of player, subscriptions, account memberships, player tracking information, skill requirements of the game, etc.);
v. Type of action taken, or alteration made to the game (e.g., game rule change, paytable change, or other configuration change related to game outcome); and

m) The current status of the player account (e.g., active, inactive, closed, excluded, etc.).

2.8.6 Incentive Information

For Interactive Gaming Systems which support incentive awards that are redeemable for cash, wagering credits, or merchandise, the information to be maintained and backed up by the Interactive Gaming System for each incentive offered shall include, as applicable:

a) Unique incentive offer ID;
b) The date and time the incentive was made available;
c) Current balance for incentive awards;
d) Total amount of incentive awards issued;
e) Total amount of incentive awards redeemed;
f) Total amount of incentive awards expired;
g) Total amount of incentive award adjustments;
h) The current status of the incentive (active, disabled, decommissioned, etc.); and
i) The date and time the incentive was or is scheduled to be decommissioned (blank until known).

2.8.7 Jackpot Information

For Interactive Gaming Systems which support progressive jackpots or incrementing jackpots, the information to be maintained and backed up by the Interactive Gaming System for each jackpot offered shall include, as applicable:

a) Unique jackpot ID (if jackpot is not tied to a particular game theme, paytable, or player);
b) The date and time the jackpot was made available;
c) The participating game theme/paytable ID(s);

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d) Unique Player ID(s), if the jackpot is tied to particular player(s);
e) Current value of the jackpot (payoff);
f) Any other pools containing jackpot contributions, as applicable:
   i. Current value of amount exceeding ceiling, where required by the regulatory body (overflow);
   ii. Current value of the Jackpot Diversion Scheme (diversion pool);
g) Reset value of the current jackpot if different from startup value (reset value);
h) Where such parameters are configurable after initial setup:
   i. Initial value of the jackpot (startup value);
   ii. Percentage increment rate (increment);
   iii. Jackpot limit value (ceiling);
   iv. Percentage increment rate after ceiling is reached (secondary increment);
   v. Percentage increment rate for diversion pool (hidden increment);
   vi. Diversion pool limit value (diversion limit);
   vii. The odds of triggering the jackpot (odds);
   viii. Any parameters which indicate time periods the jackpot is available for triggering (time limit);
   ix. Any additional information needed to properly reconcile the jackpot;
i) The current status of the jackpot (active, disabled, decommissioned, etc.); and
j) The date and time the jackpot was or is scheduled to be decommissioned (blank until known).

NOTE: It is expected that for non-configurable parameters not maintained or backed up by the Interactive Gaming System, there will be documentation available to the operator indicating such static values.

2.8.8 Significant Event Information

Significant event information to be maintained and backed up by the Interactive Gaming System shall include, as applicable:

a) Failed account access attempts, including IP Address;
b) Program error or authentication mismatch;
c) Significant periods of unavailability of any critical component of the system (any length of time game play is halted for all players, and/or transactions cannot be successfully completed for any user);
d) Large wins (single and aggregate over defined time period) in excess of a value specified by the regulatory body, including game play information;
e) Large wagers (single and aggregate over defined time period) in excess of a value specified by the regulatory body, including game play information;
f) System voids, overrides, and corrections;
g) Changes to live data files occurring outside of normal program and operating system execution;
h) Changes that are made to the download data library, including the addition, changing or deletion of software, where supported;
i) Changes to policies and parameters for operating systems, databases, networks, and applications (e.g., audit settings, password complexity settings, system security levels, manual updates to databases, etc.);
j) Changes to date/time on master time server;

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k) Changes to game theme parameters (e.g., game rules, payout schedules, rake percentage, paytables, etc.);
l) Changes to progressive jackpot or incrementing jackpot parameters;
m) Changes to incentive parameters (e.g., start/end, value, eligibility, restrictions, etc.);
n) Player Account Management:
    i. Adjustments to a player account balance;
    ii. Changes made to PII and other sensitive information recorded in a player account;
    iii. Deactivation of a player account;
    iv. Large financial transactions (single and aggregate over defined time period) in excess of a value specified by the regulatory body, including transaction information;
    v. Negative player account balance (due to adjustments and/or chargebacks);
o) Irrecoverable loss of PII and other sensitive information;
p) Any other activity requiring user intervention and occurring outside of the normal scope of system operation; and
q) Other significant or unusual events as deemed applicable by the regulatory body.

2.8.9 User Access Information

For each user account, the information to be maintained and backed up by the Interactive Gaming System shall include:

a) Employee name and title or position;
b) User identification;
c) Full list and description of functions that each group or user account may execute;
d) The date and time the account was created;
e) The date and time of last access, including IP Address;
f) The date and time of last password change;
g) The date and time the account was disabled/deactivated;
h) Group membership of user account (if applicable); and
i) The current status of the user account (e.g., active, inactive, closed, suspended, etc.).

2.9 Reporting Requirements

2.9.1 General Reporting Requirements

The Interactive Gaming System shall be capable of generating the information needed to compile reports as required by the regulatory body. In addition to meeting the requirements in the section above for "Data Retention and Time Stamping", the following requirements shall apply for required reports:

a) The system shall be able to provide the reporting information on demand, on a daily basis, and for other intervals required by the regulatory body (e.g., month-to-date (MTD), year-to-date (YTD), life-to-date (LTD), etc.).
b) Each required report shall contain:
    i. The operator's name (or other identifier), the title of report, the selected interval and the date/time the report was generated;

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ii. An indication of "No Activity" or similar message if no information appears for the period specified; and
iii. Labeled fields which can be clearly understood in accordance with their function.

NOTE: In addition to the reports outlined in this section, the regulatory body may also require other reports utilizing the information stored under the "Information to be Maintained" section of this document.

2.9.2 Game Performance Reports

The Interactive Gaming System shall be able to provide the following information needed to compile one or more reports on game performance for each game theme or paytable, as applicable:

a) The name of the game theme and game type (reel, blackjack, poker, table, etc.);
b) The date and time the game theme/paytable was made available for play;
c) For house-banked games:
   i. Theoretical RTP percentage;
   ii. Actual RTP percentage;
d) The number of games played;
e) Total amount of wagers collected, including separate amounts for incentive credits;
f) Total amount of winnings paid to players, including separate amounts for incentive credits and/or prizes;
g) Total amount of wagers voided or cancelled, including separate amounts for incentive credits;
h) Total rake, commission, and fees collected;
i) Total funds remaining in interrupted games, including separate amounts for incentive credits;
j) Game theme/paytable ID; and
k) The current status of the game theme/paytable (active, disabled, decommissioned, etc.).

2.9.3 Operator Liability Reports

The Interactive Gaming System shall be able to provide the following information needed to compile one or more reports on operator liability, as applicable:

a) Total amount held by the operator for the player accounts; and
b) Any operational funds used to cover all other operator liability if defined by the regulatory body.

2.9.4 Large Jackpot Payout Reports

For Interactive Gaming Systems which support progressive jackpots or incrementing jackpots, the Interactive Gaming System shall be able to provide the following information needed to compile one or more reports on jackpot payouts which exceed a particular value as defined by the regulatory body, as applicable:

a) Unique jackpot ID (if jackpot is not tied to a particular game theme, paytable, or player);
b) Winning player ID;
c) Winning game theme/paytable ID;

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d) Winning game cycle ID and/or gaming session ID (if different);
e) The date and time of jackpot trigger;
f) Jackpot hit and payoff amount; and
g) Identification of user(s) who processed and/or confirmed the win.

2.9.5 Significant Events and Alterations Reports

The Interactive Gaming System shall be able to provide the following information needed to compile one or more reports for each significant event or alteration, as applicable:

a) The date and time of the significant event or alteration;
b) Event/component identification;
c) Identification of user(s) who performed and/or authorized the significant event or alteration;
d) Reason/description of the significant event or alteration, including data or parameter altered;
e) Data or parameter value before alteration; and
f) Data or parameter value after alteration.

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Chapter 3: Random Number Generator (RNG) Requirements

3.1 Introduction

3.1.1 General Statement

This chapter sets forth the technical requirements for a Random Number Generator (RNG). The types of RNGs include the following:

a) Software-based RNGs do not use hardware devices and derive their randomness principally and primarily from a computer-based or software-driven algorithm. They do not incorporate hardware randomness in a significant way.
b) Hardware-based RNGs derive their randomness from small-scale physical events (e.g., electric circuit feedback, thermal noise, radioactive decay, photon spin, etc.).
c) Mechanical RNGs generate game outcomes mechanically, employing the laws of physics (e.g., wheels, tumblers, blowers, shufflers, etc.).

NOTE: See also related requirements found in "Game Outcome Using a Random Number Generator" section as contained in the "Game Requirements" chapter of this standard.

3.2 General RNG Requirements

3.2.1 Source Code Review

The independent test laboratory shall review the source code pertaining to any and all core randomness algorithms, scaling algorithms, shuffling algorithms, and other algorithms or functions that play a critical role in the final random outcome selected for use by a game. This review shall include comparison to published references, where applicable, and an examination for sources of bias, errors in implementation, malicious code, code with the potential to corrupt behavior, or undisclosed switches or parameters having a possible influence on randomness and fair play.

3.2.2 Statistical Analysis

The independent test laboratory shall employ statistical tests to assess the outcomes produced by the RNG, after scaling, shuffling, or other mapping (hereafter referred to as "final outcome output"). The independent test laboratory shall choose appropriate tests on a case-by-case basis, depending on the RNG under review and its usage within the game. The tests shall be selected to assure conformance to intended distribution of values, statistical independence between draws, and, if applicable, statistical independence between multiple values within a single draw. The applied tests shall be evaluated, collectively, at a 99% confidence level. The amount of data tested shall be such that significant deviations from applicable RNG testing criteria can be detected with high frequency. In the case of an RNG intended for variable usage, it is the responsibility of the independent test laboratory to select and test a representative set of usages as test cases. Statistical tests may include any one or more of the following:

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a) Total Distribution or Chi-square test;
b) Overlaps test;
c) Coupon Collector's test;
d) Runs test;
e) Interplay Correlation test;
f) Serial Correlation test; and
g) Duplicates test.

3.2.3 Distribution

Each possible RNG selection shall be equally likely to be chosen. Where the game design specifies a non-uniform distribution, the final outcome shall conform to the intended distribution.

a) All scaling, mapping, and shuffling algorithms used shall be unbiased, as verified by source code review. The discard of RNG values is permissible in this context and may be necessary to eliminate bias.
b) The final outcome output shall be tested against intended distribution using appropriate statistical tests (e.g., Total Distribution test).

3.2.4 Independence

Knowledge of the numbers chosen in one draw shall not provide information on the numbers that may be chosen in a future draw. If the RNG selects multiple values within the context of a single draw, knowing one or more values shall not provide information on the other values within the draw, unless provided for by the game design.

a) As verified by source code review, the RNG shall not discard or modify selections based on previous selections, except where intended by game design (e.g., without-replacement functionality).
b) The final outcome output shall be tested for independence between draws and, as applicable, independence within a draw, using appropriate statistical tests (e.g., Serial or Interplay Correlation tests, and Runs test).

3.2.5 Available Outcomes

As verified by source code review, the set of possible outcomes produced by the RNG solution (i.e., the RNG period), taken as a whole, shall be sufficiently large to ensure that all outcomes shall be available on every draw with the appropriate likelihood, independent of previously produced outcomes, except where specified by the game design.

3.3 RNG Strength and Monitoring

3.3.1 RNG Strength for Outcome Determination

The RNG used in the determination of game outcomes in a Gaming Platform shall be cryptographically strong. "Cryptographically strong" means that the RNG is resistant to attack or

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compromise by an intelligent attacker with modern computational resources, and who may have knowledge of the source code of the RNG.

3.3.2 Cryptographic RNG Attacks

A cryptographic RNG cannot be feasibly compromised by a skilled attacker with knowledge of the source code. At a minimum, cryptographic RNGs shall be resistant to the following types of attack:

a) Direct Cryptanalytic Attack: Given a sequence of past values produced by the RNG, it shall be computationally infeasible to predict or estimate future RNG values. This shall be ensured through the appropriate use of a recognized cryptographic algorithm (RNG algorithm, hash, cipher, etc.). Note that a hardware-based RNG or a mechanical RNGs may potentially qualify as a cryptographic algorithm, provided it passes statistical testing;
b) Known Input Attack: It shall be infeasible to computationally determine or reasonably estimate the state of the RNG after initial seeding. In particular, the RNG shall not be seeded from a time value alone. The manufacturer shall ensure that games will not have the same initial seed. Seeding methods shall not compromise the cryptographic strength of the RNG; and
c) State Compromise Extension Attack: The RNG shall periodically modify its state, through the use of external entropy, limiting the effective duration of any potential exploit by a successful attacker.

NOTE: Because of continuous computational improvements and advances in cryptographic research, compliance to this criterion shall be re-evaluated as required by the regulatory body.

3.3.3 Dynamic Output Monitoring for Hardware-Based RNGs

Due to their physical nature, the performance of hardware-based RNGs may deteriorate over time or otherwise malfunction, independent of the Gaming Platform. The failure of a hardware-based RNG could have serious consequences for the intended usage of the RNG. For this reason, if a hardware-based RNG is used, there shall be dynamic monitoring of the output by statistical testing. This monitoring process shall disable game play when malfunction or degradation is detected.

3.4 Mechanical RNG (Physical Randomness Device)

3.4.1 General Statement

The requirements defined within this section apply to mechanical RNGs or “physical randomness devices”. While software may be a part of the device, the software is primarily limited to operating machinery and/or reading and recording game outcome data (the software does not play a deterministic role in determining the game outcome).

NOTE: Devices which faithfully and mechanically create or display a game outcome selected by a computer RNG are not considered physical randomness devices and shall be tested as RNGs once the faithful reproduction of RNG selected outcome has been assured. Physical randomness devices may incorporate RNGs in secondary roles (e.g., rotation speed). Such secondary RNGs need not be evaluated against the RNG requirements contained herein, as they do not directly select the game outcome. Rather, the physical

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randomness device shall be tested as a whole as described in this section.

NOTE: The approved components of a physical randomness devices cannot be swapped out or replaced with unapproved components, as they are integral to the behavior and performance of the physical randomness devices. The "approved components" in this context include those physical items that produce the random behavior – e.g., balls in a mixer, cards in a shuffler, etc. As one example, a shuffler certified by the independent test laboratory to utilize plastic cards cannot be viewed as an approved equivalent to the same mechanical shuffler using paper cards.

3.4.2 Data Collection

To provide best assurance of random behavior, the independent test laboratory shall collect game outcome data for at least 10,000 game outcomes. The data collection shall be accomplished in a fashion reasonably similar to the intended use of the device in the field. In particular, the recommended setup and calibration shall be executed initially, and the device and components (cards, balls, etc.) shall be replaced or serviced during the collection period as recommended by the manufacturer.

NOTE: Due to feasibility concerns associated with reasonable data collection on some devices, the regulatory body may elect to accept testing results from a smaller collection amount on a case-by-case basis. Equally possible, a larger data collection sample may be required. Regardless, the independent test laboratory will clearly state in the applicable certification, the amount of data used for testing. When less than 10,000 games are used, a statement on the statistical limitations of reduced testing will be clearly denoted within the certification report.

3.4.3 Durability

All mechanical pieces shall be constructed of materials to prevent degradation of any component over its intended lifespan.

NOTE: The independent test laboratory may recommend a stricter replacement schedule than that suggested by the manufacturer of the device to comply with the 'Durability' requirement stated above. In addition, the independent test laboratory may recommend periodic inspection of the device to ensure and maintain its integrity.

3.4.4 Tampering

The players and/or gaming attendants (e.g., dealers, croupiers, etc.) used in live games shall not have the ability to manipulate or influence the physical randomness devices in a physical manner with respect to the production of game outcome data, except as intended by game design.

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Chapter 4: Game Requirements

4.1 Introduction

4.1.1 General Statement

This chapter sets forth the technical requirements for the player interface, rules of play, game fairness, game selection, game outcome, related player displays and artwork, payout percentages and odds, bonus/feature games, progressive jackpots, incrementing jackpots game recall, game modes, common features, games with skill, tournaments, and other game requirements.

NOTE: Please reference the "Games with Skill" section of this technical standard for specific and supplemental requirements for games containing one or more skill elements.

4.2 Player Interface

4.2.1 General Statement

The player interface is defined as an interface application or program through which the user views and/or interacts with the Player Software, including the touch screen(s), keyboard, mouse, or other forms of player interaction devices.

4.2.2 Player Interface Requirements

The player interface shall meet the following requirements:

a) Any resizing or overlay of the player interface screen shall be mapped accurately to reflect the revised display and touch/click points.
b) All player-selectable touch/click points or buttons represented on the player interface that impact game play and/or the integrity or outcome of the game shall be clearly labeled according to their function and shall operate in accordance with applicable game rules.
c) There shall be no hidden or undocumented touch/click points or buttons anywhere on the player interface that affect game play and/or that impact the integrity or outcome of the game, except as provided for by the game rules.
d) The display of the instructions and information shall be adapted to the player interface. For example, where a device uses technologies with a smaller display screen, it is permissible to present an abridged version of the game information accessible directly from within the game screen and make available the full/complete version of the game information via another method, such as a secondary screen, help screen, or other interface that is easily identified on the visual game screen.
e) Where multiple items of instructions and information are displayed on the player interface, it is acceptable to have this information displayed in an alternating fashion provided that, the rate at which information alternates permits a player a reasonable opportunity to read each item.

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4.2.3 Simultaneous Inputs

Simultaneous or sequential activation of various player interaction devices comprising a player interface shall not cause game malfunctions and shall not lead to results that are contrary to a game's design intent.

4.3 Gaming Session Requirements

4.3.1 General Statement

A gaming session is defined as the period of time commencing, at minimum, when a player initiates a game or series of games on a Gaming Platform for a particular game theme by committing a wager and ending at the time of a final game outcome for that game or series of games and coincident with the opportunity for the player to exit the game.

NOTE: This standard is not intended to preclude or prohibit designs that allow the simultaneous play of multiple games themes on a Gaming Platform. Where multiple game themes are accessible simultaneously, players may play more than one game at a time in separate gaming sessions. However, in such a case, metering and applicable limits shall be enforced against each available game, as it is played, and all other requirements within this chapter shall continue to apply to these multiple game-in-play designs.

4.3.2 Selection of Game

The following requirements apply to the selection of a specific game on the player interface:

a) The Gaming Platform shall clearly inform the player of all games available for play.
b) The player shall be made aware of which game theme has been selected for play and is being played.
c) The player shall not be forced to play a game just by selecting a game theme, unless the game screen clearly indicates the game selection is unchangeable. If not disclosed, the player shall be able to return to the main menu or game chooser screen prior to committing a wager.
d) The default game display upon entering game play mode from a main menu or game chooser screen, shall not correspond to the highest advertised award (unless that was the outcome of the player's last game play). This applies to the primary game only and not to any secondary bonuses/features.

4.3.3 Game Play Requirements

The following requirements apply to game play within a gaming session:

a) A game cycle consists of all player actions and game play activity that occur from wager to wager. Game cycle initiation shall occur after the player:
    i. Places a wager or commits a bet; and/or
    ii. Presses a "play" button or performs a similar action to initiate a game in accordance with the rules of the game.
b) Amounts wagered or committed at any point at the start of, or within the course of a game cycle

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shall be subtracted from the player's credit meter or player account balance. A wager shall not be accepted that could cause the player to have a negative balance.

c) The following game elements shall be considered to be part of a single game cycle:
   i. Games that trigger a free game bonus/feature and any subsequent free games;
   ii. "Second screen" bonuses/features;
   iii. Games with player choice (e.g., draw poker or blackjack);
   iv. Games where the rules permit wagering of additional credits (e.g., blackjack insurance, or the second part of a two-part keno game); and
   v. Double-up/gamble features.
d) A game cycle shall be considered complete when all funds wagered are lost or when the final transfer to the player's credit meter or player account balance takes place. The value of every award at the end of a game cycle is added to the player's credit meter or player account balance, except for merchandise and large payouts where required by the regulatory body.
e) It shall not be possible to start a new game within the same gaming session before the current game cycle is completed and the funds available for wagering and the game history have been updated, including the game elements listed above, unless the action to start a new game terminates the current game in an orderly manner. Some exceptions may be granted in instances where, for example, if the operator elects to conduct offline, manual consideration of large payouts, or if a player chooses to continue gaming while a large payout is pending.

4.3.4 Information to be Displayed

A player interface shall display the following information within a gaming session, with the exception of when the player is viewing an informational screen such as a menu or help screen:

a) Current funds available for wagering;
b) Denomination being played (if applicable);
c) Current wager amount and placement of all active wagers, or sufficient display information to otherwise derive these parameters;
d) Any player wager options that occur prior to game initiation, or during the course of game play;
e) For the last completed game, the following information until the next game starts, wager options are modified, or the player exits the game;
   i. Accurate representation of the game outcome;
   ii. Amount won; and
   iii. Any player wager options in effect.

NOTE: It is acceptable for the information for the last completed game to be cleared before the above-mentioned conditions occur as long as the same information is clearly available to the player under the "Game Recall" section of this document.

4.3.5 Credit Meter

Depending on the implementation within the Gaming Platform, funds may be transferred from the player account balance to a credit meter for the gaming session. This may be automatic where the player account balance is automatically transferred to the credit meter or the Gaming Platform presents transfer options to the player, which require selection before occurring. Such options

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would include how much the player wishes to transfer to the session's credit meter. Once play is complete the player shall have the option to transfer some or all of their funds back to their player account balance. Exiting a gaming session shall cause all funds to be automatically transferred back to their player account balance. Additionally, the credit meter, shall conform to the following requirements when in use:

a) The credit meter shall be visible to the player at any time a wager may be placed, at any time a transfer to or from the player account balance is allowed, or at any time the meter is actively being incremented or decremented.
b) The credit meter shall be displayed in credits or local currency format. If the game's credit meter allows for toggling between credits and currency, this functionality shall be easily understood by the player. The credit meter shall clearly indicate whether credits or currency are currently being displayed.
c) If the current local currency amount is not an even multiple of the denomination for a game, or the credit amount has a fractional value, the credits displayed for that game may be displayed and played as a truncated amount, (i.e., fractional part removed). However, the fractional credit amount shall be made available to the player when the truncated credit balance is zero.
d) If restricted incentive credits and unrestricted player funds are combined on one credit meter, restricted credits shall be wagered first, as allowed by the rules of the game, before any unrestricted player funds are wagered.

4.4 Game Information and Rules of Play

4.4.1 Game Information and Rules of Play

The following requirements apply to the game information, artwork, paytables, and help screens including any written, graphical, and auditory information provided to the player either directly from the player interface or from a page accessible to the player:

a) Player interface and player interaction device usage instructions, paytable information, and rules of play shall be complete and unambiguous and shall not be misleading or unfair to the player.
b) Help screen information shall be accessible by a player without the need for funds deposited or commitment of a wager. This information shall include descriptions of unique game bonuses/features, extended play, free spins, double-up, autoplay, countdown timers, symbol transformations, community bonuses, progressive jackpots, incrementing jackpots, etc.).
c) Minimum, maximum, and other available wagers shall be stated within, or be able to be deduced from, the artwork, with adequate instruction for any available wager option.
d) Paytable information shall include all possible winning outcomes and combinations, along with their corresponding payouts, for any available modifiers and/or wager options.
e) The artwork shall clearly indicate whether awards are designated in credits, currency, or some other unit.
f) For artwork that contains game instructions explicitly advertising a credit award or merchandise prize, it shall be possible to win the advertised award/prize from a single game, or series of games enabled by an initiating game, when including bonuses/features, or other game options, or the artwork shall clearly specify the criteria necessary to win the advertised

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award/prize.

g) The game shall reflect any change in award value, which may occur during the course of play. This may be accomplished with a digital display in a conspicuous location of the player interface. The game shall clearly state the criteria for which any award value is modified.
h) Game instructions that are presented aurally shall also be presented in written form within the artwork.
i) Game instructions shall be rendered in a color that contrasts with the background color to ensure that all instructions are clearly visible/readable.
j) The artwork shall clearly state the rules for payments of awards. If a specific winning combination is paid where multiple wins are possible, then the payment method shall be described.
    i. The artwork shall clearly communicate the treatment of coinciding game outcomes. For example, whether or not a straight flush is construed as both a flush and a straight, or if 3/4/5 of a kind can be construed as paying all of kind or just the highest. Where a payline may be interpreted to have more than one such winning combination, there shall be a statement if only the highest winning combination is paid per line.
    ii. Where the same symbol can qualify for a line pay and scatter pay simultaneously or where line and scatter pays occur simultaneously on the same line, the artwork shall indicate if the player will be paid for both wins, or the greater of the two.
    iii. The artwork shall clearly communicate the treatment of coinciding scattered wins with respect to other possible scattered wins. For example, the artwork shall state whether combinations of scattered symbols pay all possible awards or only the highest award.
k) Where multiplier instructions are displayed in artwork, it shall be clear what the multiplier does and does not apply to.
l) All game symbols/objects shall be clearly displayed to the player and shall not be misleading.
    i. Game instructions that specifically correspond to one or more symbols/awards, shall be clearly associated with those symbols/awards. For example, this may be achieved with appropriate framing or boxing. Additional wording such as “these symbols” may also be used.
    ii. If game instructions refer to a particular symbol, and the written name for the symbol may be mistaken for another symbol, or may imply other characteristics, then the visual display of the instructions shall clearly indicate to which symbol the instruction refers.
    iii. Game symbols and objects shall retain their shape throughout all artwork, except while animation is in progress. Any symbol that changes shape or color during an animation process shall not appear in a way that can be misinterpreted to be some other symbol defined in the paytable.
    iv. If the function of a symbol changes (e.g., a non-substitute symbol becomes a substitute symbol during a feature), or the symbol’s appearance changes, the artwork shall clearly indicate this change of function or appearance and any special conditions that apply to it.
    v. If limitations exist with respect to the location and/or appearance of any symbol, the limitation shall be disclosed in the artwork. For example, if a symbol is only available in a bonus game, or on a specific reel strip, then the artwork shall disclose this.
m) The artwork shall clearly state which symbols/objects may act as a substitute or wild, and in which winning combinations the substitute or wild may be applied; this description shall address any/all phases of game play where a wild or substitute symbol operates.
n) The artwork shall clearly state which symbols/objects may act as a scatter and in which

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winning combinations the scatter may be applied.

o) The artwork shall contain textual and/or graphical information to clearly explain the order in which symbols are to appear, in order for an award to be issued or a feature to be triggered, including numbers to indicate how many correct symbols/objects each pattern corresponds to.
p) The game shall not advertise 'upcoming wins', for example, "three times pay coming soon", unless the advertisement is accurate and mathematically demonstrable, or unless the player has a direct advertisement of the current progress to that win (e.g., they have two of four tokens collected that are required to win an award).
q) The game artwork shall clearly explain to the player any non-wager purchase option and its value in credits or local currency.
r) The artwork shall disclose any restrictive features of game play, such as any play duration limits, maximum win values, etc. which are implemented as an element of game design.
s) There shall be sufficient information regarding any award payout adjustments such as a rake, commission, or fee taken by the operator, as applicable.

4.4.2 Multi-Wager Games

The following requirements shall apply, as relevant to the specific game design, to games where multiple, independent wagers can simultaneously be applied towards advertised awards:

a) Each individual wager placed shall be clearly indicated so that the player is in no doubt as to which wagers have been made and the credits bet per wager;
b) The winning amount for each separate wager, and total winning amount, shall be displayed on the game screen; and
c) Each winning award obtained shall be displayed to the player in a way that clearly associates the award to the appropriate wager. Where there are wins associated with multiple wagers, each winning wager may be indicated in turn. In cases where there is a multitude of wager information to convey, a summary screen may suffice. Any exceptions will be reviewed by the independent test laboratory on a case-by-case basis.

4.4.3 Line Games

The following requirements apply, as relevant to the specific game design, to line games:

a) For multi-line games, the game shall provide a summary display of the paylines that are available to form winning combinations;
b) Each individual line to be played shall be clearly indicated by the game so that the player is in no doubt as to which lines are being wagered upon. Displaying the number of wagered lines shall be sufficient to meet this requirement;
c) For games that permit multiple credits to be wagered on selected lines, the artwork shall:
    i. For linear pays, clearly state that the win(s) for each selected line will be multiplied by the bet multiplier; or
    ii. For non-linear pays, convey all possible wagers and their awards;
d) The bet multiplier shall be shown. It is acceptable if this may be easily derived from other displayed information;
e) The artwork shall indicate any rules and/or limitations which pertain to how pays are

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evaluated, including an indication of:
i. How line wins are evaluated (i.e., left to right, right to left, or both ways);
ii. How individual symbols are evaluated (i.e., whether pays are awarded on adjacent reels only, or as scatter pays); and

f) Winning paylines shall be clearly discernible to the player. Where there are wins on multiple lines, each winning payline shall be indicated in turn. This requirement shall not preclude other intuitive methods of displaying line wins such as the grouping of common win types, nor shall it prohibit a player option to bypass a detailed outcome display of line wins, where supported.

4.4.4 Card Games

The following requirements apply, as relevant to the specific game design, to games depicting cards being drawn from one or more card decks:

a) At the start of each game and/or hand, the cards shall be drawn from a randomly shuffled deck(s). It is acceptable to draw random numbers for replacement cards at the time of the first hand's random number draw, provided that the replacement cards are sequentially used as needed, and so long as any stored RNG values are encrypted;
b) Cards once removed from the deck(s) shall not be returned to the deck(s) except as provided by the rules of the game;
c) The deck(s) shall not be reshuffled except as provided by the rules of the game;
d) The game shall alert the player as to the number of cards in a deck and the number of decks in play;
e) Card faces shall clearly display the card value and the suit; and
f) Jokers and wild cards shall be distinguishable from all other cards.

4.4.5 Poker Games

The following requirements apply, as relevant to the specific game design, to simulations of poker games:

a) The artwork shall provide clear indication of what variant of poker is being played and the rules that apply;
b) Wild card rules shall be clearly explained in the help screens; and
c) Held and non-held cards, including recommended holds where allowed, shall be clearly marked on the screen. The method for changing a selected card state shall be clearly displayed to the player.

4.4.6 Blackjack Games

The following requirements apply, as relevant to the specific game design, to simulations of blackjack games:

a) Insurance rules shall be clearly explained, if insurance is available;
b) Pair split rules shall be explained to include:
i. Split aces have only one card dealt to each ace, if this is the game rule;

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ii. Further splits, if available;
iii. Double-down after splits, if available;

c) Double-down rules shall be clearly explained, including limitations of which totals may allow a double-down to be selected;
d) Any limits on the number of cards that may be drawn by player and/or dealer shall be explained, including winners declared (if any) when the limit is reached (e.g., five under wins);
e) Surrender rules, if any, shall be explained;
f) If pair splits have occurred, the results for each hand shall be shown (e.g., total points, resultant win or loss category, amount won, amount wagered);
g) Special rules, if any, shall be clearly explained; and
h) All player options that are available at any point in time shall be shown in the artwork.

4.4.7 Roulette Games

The following requirements apply, as relevant to the specific game design, to simulations of roulette games:

a) The method of selecting individual wagers shall be explained by the game rules;
b) The wager(s) already selected by the player shall be displayed on the screen; and
c) The result of each spin of the roulette wheel shall be clearly shown to the player.

4.4.8 Dice Games

The following requirements apply, as relevant to the specific game design, to simulations of dice games:

a) Each die face shall clearly show the number of spots or other indication of the face value;
b) It shall be obvious which is the up face on each die, after the dice are thrown; and
c) The result of each die shall be clearly visible or displayed.

4.4.9 Sports/Racing Games

The following requirements apply, as relevant to the specific game design, to simulations of sports or racing games:

a) Each participant in a game shall be unique in appearance, where applicable to the wager;
b) The results of a game shall be clear and not open to misinterpretation by the player;
c) If awards are to be paid for combinations involving participants other than solely the first-place finisher, the order of the participants that can be involved with these awards shall be clearly shown on the screen (e.g., result 8-4-7); and
d) The rules for any exotic wagering options (e.g., perfecta, trifecta, quinella, etc.), and the expected payouts, shall be clearly explained in the artwork.

4.4.10 Ball/Number Drawing Games

The following requirements apply, as relevant to the specific game design, to games depicting balls

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or numbers being drawn from a pool:

a) Simulated balls/numbers shall be drawn from a randomly mixed pool consisting of the full set of balls/numbers applicable to the game rules;
b) At the start of each game, only the balls/numbers applicable to the game are to be depicted. For games with bonuses/features and additional balls/numbers that are selected, they shall be chosen from the original selection unless otherwise allowed for by the game rules;
c) The pool shall not be re-mixed except as provided by the rules of the game depicted; and
d) All balls/numbers drawn shall be clearly displayed to the player.

4.4.11 Keno/Bingo/Lottery Games

The following requirements apply, as relevant to the specific game design, to simulations of keno, bingo, or lottery games, where balls or numbers are drawn, and a player tries to pick in advance which of the balls/numbers will be selected:

a) All of the player's selections shall be clearly identified directly on the game screen. Where the game uses multiple player cards, it is acceptable for the player's selections to be accessible by flipping or switching through the cards;
b) The drawn numbers shall be clearly identified on the screen;
c) The game shall highlight numbers drawn which match the player's selections;
d) Special hits, if any, shall be clearly identified;
e) The screen shall provide clear indication of how many spots were selected and how many hits were achieved; and
f) Rules for purchase of additional features of the game, if any, shall be explained.

4.4.12 Scratch Ticket Games

The following requirements apply, as relevant to the specific game design, to simulations of scratch ticket games, where an electronic scratch ticket is purchased by the player:

a) Electronic scratch ticket games shall rely on randomness as opposed to player skill;
b) A precise definition of which player choices are required to complete the game shall be shown on the artwork;
c) For games that leverage popular real-life themes (cards, dice, etc.), but do not mirror actual game play and probabilities a disclaimer shall be added to the artwork that states outcomes are not distributed with the probabilities that would typically be expected from this game; and
d) After the player purchases an electronic scratch ticket, the outcome and prize of the game shall be revealed to the player. The player may or may not have to interact with the electronic scratch ticket to reveal the win/loss results, as required by the regulatory body.

4.4.13 Multi-Player Games

The following requirements apply, as relevant to the specific game design, to multi-player games:

a) The multi-player game shall be designed such that the actions of or results obtained by any one

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player do not affect the outcome(s) of any other player, unless otherwise denoted by the game rules; and
b) There shall be a method provided by a multi-player game for each player to know when the next game will begin.

NOTE: Please reference the "Peer-to-Peer (P2P) Gaming Sessions" section of this chapter for specific and supplemental requirements for multi-player games where players compete against one another.

4.5 Game Outcome Using a Random Number Generator (RNG)

4.5.1 RNG and Evaluation of Game Outcome

The evaluation of game outcome using an RNG shall comply with the following rules:

a) Where more than one RNG is used to determine different game outcomes, each RNG shall be separately evaluated; and
b) Where each instance of an RNG is identical, but involves a different implementation within the game, each implementation shall be separately evaluated.

4.5.2 Game Selection Process

Determination of events of chance that result in a monetary award shall not be influenced, affected, or controlled by anything other than the values selected by an approved RNG, in accordance with the following requirements:

a) When making calls to the RNG, the game shall not limit the outcomes available for selection, except as provided for by game design;
b) The game shall not modify or discard outcomes selected by the RNG due to adaptive behavior. Additionally, outcomes shall be used as directed by the rules of the game;
c) After selection of the game outcome, the game shall not display a "near miss" where it makes a variable secondary decision which affects the result shown to the player. For example, if the RNG chooses a losing outcome, the game shall not substitute a different losing outcome to show to the player than that originally selected;
d) Except as provided for by the rules of the game, events of chance shall be independent and shall not correlate with any other events within the same game, or events within previous games:
    i. A game shall not adjust the likelihood of a bonus/feature occurring, based on the history of awards obtained in previous games;
    ii. A game shall not adapt its theoretical return to the player based on past payouts;
e) Any associated equipment used in conjunction with a Gaming Platform shall not influence or modify the behaviors of the game's RNG and/or random selection process, except as authorized, or intended by design; and
f) Events of chance shall not be affected by the effective bandwidth, link utilization, bit error rate or other characteristic of the communications channel between the Gaming Platform and the Remote Player Device. The player shall be informed where these characteristics may have, or appear to have, any other effect on the game, such as in decision making where speed is a factor, the update of the jackpot displays, or disconnection from multi-player games.

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4.6 Game Fairness

4.6.1 Game Fairness

The following requirements shall apply to the fairness of the game:

a) Games that are designed to give a player the perception that they have control over the outcome of the game due to skill or dexterity, when they actually do not (i.e., the game outcome is random, and the illusion of skill is for entertainment value only), shall fully disclose this fact within the game help screens. This does not apply to games that have no basis for skill and/or where no strategy applies. An example would be a simple pick-a-bonus game, where it is obvious to the player that the outcome is chance-based;
b) Games shall not include any hidden source code that can be leveraged by a player to circumvent the rules of play and/or the intended behaviors of game design; this requirement shall not preclude reasonably identifiable "discovery features" offered by a game which are intentional from a design perspective, but which may be undocumented or unknown to the player; and
c) The final outcome of each game shall be displayed for a sufficient length of time that permits a player a reasonable opportunity to verify the outcome of the game; this requirement shall not preclude an option for the player to bypass the outcome display.

4.6.2 Simulation of Physical Objects

Where a game incorporates a graphical representation or simulation of a physical object that is used to determine game outcome, the behaviors portrayed by the simulation shall be consistent with the real-world object, unless otherwise denoted by the game artwork. This requirement does not apply to graphical representations or simulations that are utilized for entertainment purposes only. The following shall apply to the simulation:

a) The probability of any event occurring in the simulation that affects the outcome of the game shall be analogous to the properties of the physical object, unless otherwise disclosed to the player;
b) Where the game simulates multiple physical objects that would normally be expected to be independent of one another based on the rules of the game, each simulation shall be independent of any other simulations; and
c) Where the game simulates physical objects that have no memory of previous events, the behavior of the simulated objects shall be independent of their previous behavior, so as to be non-adaptive and non-predictable, unless otherwise disclosed to the player.

4.6.3 Physics Engine

Games may utilize a "physics engine" which is specialized software that approximates or simulates a physical environment, including behaviors such as motion, gravity, speed, acceleration, inertia, trajectory, etc. A physics engine shall be designed to maintain consistent play behaviors and game play environment unless an indication is otherwise provided to the player by the game artwork. A physics engine may utilize the random properties of an RNG to impact game outcome, in which

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case, the "Random Number Generator (RNG) Requirements" shall apply.

NOTE: Implementations of a physics engine in a game will be evaluated on a case-by-case basis by the independent test laboratory.

4.6.4 Live Game Correlation

Unless otherwise denoted in the game artwork, where the Gaming Platform offers a game that is recognizable as a simulation of a live casino game such as poker, blackjack, roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game. For example, the odds of getting any particular number in roulette where there is a single zero (0) and a double zero (00) on the wheel, shall be 1 in 38; the odds of drawing a specific card or cards in poker shall be the same as in the live game.

4.6.5 Random Event Probability

For games that incorporate a random event or an element of chance that affects the outcome, the mathematical probability of any chance event occurring for a paid game shall be constant, unless otherwise denoted by the game artwork.

4.7 Game Payout Percentages, Odds, and Non-Cash Awards

4.7.1 Software Requirements for Percentage Payout

Each house-banked game shall theoretically payout a minimum of seventy-five percent (75%) during the expected lifetime of the game unless otherwise specified by the regulatory body. Progressive jackpots, incrementing jackpots, incentive awards, merchandise, etc. shall not be included in the percentage payout if they are external to the game, unless required for operation.

a) The minimum percentage requirement shall be met for all wagering configurations. If a game is continuously played at any single bet level, line configuration, etc. for the life of the game, the minimum percentage requirement shall be satisfied.
b) Games that may be affected by player skill shall meet the minimum percentage requirement when using an optimal method of play that provides the greatest return to the player over a period of continuous play.
c) For progressive jackpots and incrementing jackpots used in the return to player (RTP) calculations for the game, the minimum percentage requirement shall be met using the lowest available parameters for the jackpot during the expected lifetime of the game.
d) Where allowed by the regulatory body for games in which the above minimum percentage requirements are not met (e.g., electronic scratch ticket games or lottery games), the minimum RTP of the game shall be displayed to the player and shall meet the "Return to Player (RTP) Display" requirements.

NOTE: At the discretion of the regulatory body, the independent test laboratory can apply an alternative approach to return percentage calculations.

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4.7.2 Return to Player (RTP) Display

At its discretion, a regulatory body may elect to require the artwork to contain the RTP for each house-banked game. If the RTP is displayed, the following requirements shall be met:

a) The artwork shall fully explain how the displayed RTP was determined (i.e., minimum, maximum, average, etc.) and thus how the player may realize it (i.e., wager requirements).
b) For games that may be affected by player skill, the displayed RTP shall be based on a strategy specifically advertised in the game rules or an optimal strategy that is derivable from the game rules.
c) For games that offer progressive jackpots or incrementing jackpots, limited time awards, or other bonuses/features, the variable contribution of such awards to the displayed RTP shall be clearly disclosed.
d) For games that offer bonus/feature games which require extra credits to be wagered, the displayed RTP shall consider that an additional wager was placed unless otherwise advertised.
e) If the displayed RTP represents the actual RTP, the number of game plays associated with that calculation shall be advertised along with the period with which the game plays took place.

4.7.3 Odds

The odds of achieving the highest advertised award that is based solely upon chance shall occur at least once in one hundred million (100,000,000) games, unless the game artwork prominently displays the actual odds of that award to the player. This does not apply to multiple awards won together on the same game where the aggregate prize is not advertised. This odds rule shall not apply to games which make it possible for a player to win the highest advertised award multiple times through the use of a bonus/feature. This rule shall apply to all wager categories that can win the highest advertised award. If the highest advertised award can occur within a bonus/feature, the odds calculation shall include the odds of obtaining the bonus/feature including the odds to achieve the award. This rule does not apply towards incentive awards.

4.7.4 Limitations on Awards

Limitations on the award amounts in lieu of merchandise, annuities, or payment plans shall be clearly explained to the player on the game theme that is offering such a prize.

4.8 Bonus/Feature Requirements

4.8.1 Bonus/Feature Games

Games which offer a bonus/feature shall meet the following requirements:

a) A game which offers a bonus/feature, other than those that occur randomly, shall display to the player sufficient information to indicate the current status towards the triggering of the next bonus/feature;
b) If a game requires obtaining several achievements towards the activation of a bonus/feature, or the issuance of an award, the number of achievements needed to trigger the bonus/feature, or

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win the award, shall be indicated, along with the number collected at any point;
c) The game shall make it clear to the player that they are in a bonus/feature mode;
d) If a game offers a bonus/feature which allows the player to hold one or more reels/cards/symbols for the purpose of a re-spin or draw, then the held reels/cards/symbols shall be clearly indicated and the method for changing holds shall be clearly explained to the player;
e) If a bonus/feature is triggered after accruing a certain number of events/symbols or combination of events/symbols of a different kind over multiple games, the probability of obtaining like events/symbols shall not deteriorate as the bonus/feature progresses, unless otherwise disclosed to the player; and
f) If a bonus/feature consists of multiple events or spins, then a counter shall be maintained and displayed to the player to indicate the number of spins initially awarded and the number of spins remaining during bonus/feature play, or alternatively, the number of spins that have been played.

4.8.2 Player Selection or Interaction in a Bonus/Feature

Games which offer a bonus/feature which requires player selection or interaction are prohibited from automatically making selections or initiating the bonus/feature, unless the game meets one of the requirements listed below and explains the mechanism for automatic initiation or selection in the artwork:

a) The player is presented with a choice and specifically acknowledges their intent to have the game auto-initiate the bonus/feature by means of a button press or another player interaction;
b) The bonus/feature provides only one choice to the player, i.e., press button to spin wheel. In this case, the bonus/feature may auto-initiate after a time out period of at least two minutes; or
c) The bonus/feature is offered as part of a community bonus that involves two or more players and where the delay of an offered selection or game initiation will directly impact the ability for other players to continue their bonus/feature. Prior to automatically making selections or initiating a community bonus the player shall be made aware of the time remaining in which they shall make their selection or initiate play.

4.8.3 Extra Credits Wagered During a Bonus/Feature

If a bonus/feature in progress requires extra funds to be wagered in order to continue, the player shall be provided an opportunity not to participate. If all winnings from the game in progress are accumulated to a temporary “win” meter, rather than directly to the credit meter or player account balance, the game shall:

a) Provide a means where winnings on the temporary “win” meter can be wagered (i.e., add funds to the credit meter or player account balance) to allow for instances where the player has an insufficient amount of funds available to complete the bonus/feature, or allow the player to add funds to the credit meter or player account balance; and
b) Transfer all funds on the temporary “win” meter to the credit meter or player account balance upon completion of the bonus/feature.

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4.8.4 Community Bonuses

Community bonuses, where players collaborate and/or compete for a shared award, shall:

a) Contain an appropriate description of the rules governing each community bonus, each payout and any conditions regarding player eligibility for the community bonus award(s);
b) Continuously and conspicuously display the player's eligibility for a community bonus, regardless of the number of credits on the game. For example, if the player has thirty seconds of eligibility time remaining but has run out of credits, the game will continue to display and count down the seconds remaining; and
c) For community bonuses not dependent on the number of credits available, alert the player of their continued eligibility regardless of whether the player has credits remaining on the game.

4.8.5 Double-Up/Gamble Features

The following requirements apply to games which offer some form of a double-up/gamble feature. Such games may use alternative terminology such as "Triple-Up" or "Take-or-Risk" to describe a double-up/gamble feature:

a) All double-up/gamble feature instructions shall be fully disclosed in the game's artwork and shall be accessible without committing to the feature;
b) Entry to a double-up/gamble feature shall only occur upon completion of a winning primary game;
c) The player shall have a choice as to whether or not they want to participate in the double-up/gamble feature;
d) The double-up/gamble feature shall have a theoretical return to the player of one hundred percent (100%);
e) The maximum number of double-ups/gambles available shall be clearly stated, or as a suitable alternative, the award limit for double-up/gamble shall be disclosed to the player;
f) Only credits won on the primary game shall be available for wagering on a double-up/gamble feature (i.e., it is not possible to wager any funds from the credit meter or player account balance on double-up/gamble);
g) When the double-up/gamble feature is discontinued automatically before reaching the maximum number of double-ups/gambles available, the reason shall be clearly stated;
h) Any game conditions during which the double-up/gamble feature is not available shall be specified;
i) If a double-up/gamble feature offers a choice of multipliers, it shall be clear to the player what the range of choices and payouts are; and
j) If the player selects a multiplier for a double-up/gamble feature, it shall be clearly stated on the screen which multiplier has been selected.

4.8.6 Mystery Award Features

A mystery award is an award paid by a game that is not associated with a specific paytable combination. It is acceptable for games to offer a mystery award; however, the game artwork shall indicate the minimum and maximum amounts that the player could potentially win. If the minimum

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amount that could potentially be awarded is zero, then it is not required to be explicitly displayed. If the value of the mystery award depends on credits wagered, or any other factors, the conditions shall be clearly stated.

4.9 Alternative Game Modes

4.9.1 Free Play Mode

Free play mode allows a player to participate in a game without placing a wager. If the game supports a free play mode of operation, the following requirements apply:

a) Free play games shall accurately represent the normal operation of a paid game. Games played in free play mode shall not mislead the player about the likelihood of winning any awards available in the wagered version of the game;
b) Free play mode shall be prominently displayed so a player knows at all times if/when this mode is active;
c) Free play mode shall not increment the credit meter or the player account balance. Specific meters are permissible for this mode provided the meters clearly indicate as such;
d) Free play mode shall be terminated whenever the player opts to exit this mode, or when the free play game(s) are concluded; and
e) When free play mode is exited, the game shall return to its previous state.

NOTE: Paid games which may be played with credits received from an incentive award are not considered free play games.

4.9.2 Autoplay Mode

Autoplay mode allows a game to place wagers automatically without player interaction, once a denomination, wager, and other play attributes have been selected by the player. If the game supports an autoplay mode, the following rules apply:

a) Autoplay mode shall be securely controlled using a function that either allows or disallows the feature, reflective of jurisdictional preference;
b) Autoplay mode may allow the player to choose the individual game wager, the number of autoplay wagers, and/or the total amount to be wagered;
    i. All player-defined thresholds shall remain in effect for the duration of autoplay;
    ii. The game shall display the number of autoplay wagers remaining or the number used, reflective of a player-defined threshold;
    iii. Autoplay mode shall end automatically and return to manual game play when player-defined thresholds are reached;
c) Autoplay mode shall offer the player an option to terminate autoplay mode at the completion of a current game, regardless of how many autoplay wagers they initially chose or how many remain; and
d) If player options are supported for autoplay mode, these options shall default to the manual mode of game play.

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4.9.3 Tournament Mode

Tournament mode allows a player to engage in competitive play against other players in an organized, measured event. Play during tournament mode may be in-revenue or out-of-revenue. If the game supports a specific tournament mode, which is separate from regular game play, the following requirements apply:

a) All of the rules within the "Contests/Tournaments" section of this document shall be disclosed to the player;
b) The player shall be provided with an option on whether or not to participate. If/when opting in, the player shall be able to complete their non-tournament game prior to entering the tournament mode of play, unless the Gaming Platform supports simultaneous tournament and non-tournament modes of play;
c) A message shall be prominently displayed on the game informing the player that it is operating in a tournament mode;
d) For out-of-revenue tournaments, the game shall not accept real money from any source, nor pay out real money in any way. The tournament mode shall utilize tournament-specific credits, points, or chips which shall have no cash value;
e) For time-based tournaments, a timer shall be displayed to players to indicate the remaining period of play. If a tournament is based on some extended duration of play or is initiated or concluded based upon the occurrence of a specific event, then this information shall be disclosed to the players;
f) At the conclusion of the tournament, the player rankings shall be displayed, and the winner(s) notified;
g) When exiting tournament mode, the game shall return to the original state it was in prior to entering the tournament mode; and
h) Any tournament-specific game meters displayed to the player on the game shall be automatically cleared when the tournament mode is exited.

4.10 Games with Skill

4.10.1 General Statement

A game with skill contains one or more elements in its design which can be leveraged by a player to impact the return percentage. Skill means the human attributes of a player such as knowledge, dexterity, visual recognition, logic, memory, reaction, strength, agility, athleticism, hand-to-eye coordination, numerical and/or lexical ability, or any other ability or expertise relevant to game play. The requirements defined within this section shall apply to games with skill to ensure player fairness and clarity with respect to player notification.

NOTE: This technical standard is not intended to classify a game as a "skill game" or to serve as a legal basis for game classification within the context of skill. Such classifications will be subject to interpretation by the regulatory body.

4.10.2 Display for Games with Skill

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A game with skill shall conform to the applicable display requirements found in related sections of this standard for "Game Information and Rules of Play", "Information to be Displayed", and "Game Fairness". In addition, any game with skill other than traditional casino games (e.g., poker, blackjack, etc.) shall prominently disclose that the outcome is affected by player skill. This disclosure shall be prominently displayed on the game prior to committing a wager.

4.10.3 Virtual Opponent

A game with skill may offer a player the opportunity to compete against a virtual opponent provided that the Gaming Platform:

a) Clearly and prominently discloses when a virtual opponent is participating; and
b) Prevents the virtual opponent from utilizing privileged information of the live player upon which a decision is made, unless otherwise disclosed to the player.

4.10.4 Outcome for Games with Skill

Except as otherwise disclosed to the player, once a game with skill is initiated, no function of the game related to game outcome shall be altered during play. Additionally, in the event that available paytables or rules of play change between games, notice of the change shall be prominently displayed to the player through the game artwork and shall provide adequate information so a player can make an informed decision. An example of the latter case might be the use of an identifier to change the paytables available to the player during the course of play.

4.10.5 Odds for Skill-Based Awards

If the highest advertised award is a skill-based award, it shall be available to be achieved by a player. If this skill-based award incorporates an element of chance, the opportunity to achieve the award shall meet the "Odds" requirement specified earlier in this chapter.

4.10.6 Player Advice Features

A game with skill may support a feature that offers advice, hints, or suggestions to a player. An illustrative example might be a trivia game that provides hints, clues, or other player assistance in making a selection. A game with skill may support player advice features provided that it conforms to the following requirements:

a) The player advice feature shall clearly describe to the player that it is available and what options exist for selection;
b) Any player advice that is offered to the player for purchase shall clearly disclose the cost and benefit;
c) The player advice shall not be misleading or inaccurate, and shall reflect the rules of play for the game, while noting that the game rules may change as a function of the advice offered, providing any such changes are disclosed to the player prior to acceptance of the advice;
d) The game design shall prevent access to any "information store" such that data related to the skill element is not readily available through software tampering (for example, a trivia game

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shall prevent access to an answers database);
e) The player advice feature shall allow the player the option of accepting the advice, and shall not force the player to accept the assistance unless it reflects the only possible option for the player to pursue at the time; and
f) The availability and content of player advice shall remain consistent unless otherwise disclosed and shall not adapt in a way that disadvantages the player based upon prior game play or game events.

NOTE: It is recommended that the Gaming Platform support a secure option to enable or disable player advice to accommodate regulatory bodies that may either allow or prohibit this type of feature.

4.10.7 Player Interaction Devices Used with Games Containing Skill

If unique player interaction devices (e.g., joysticks, game controllers, camera systems, sound systems, motion sensors, image sensors, accelerometers, etc.) are employed by the game to support skill, then the game with skill shall provide adequate and clear instruction on their purpose, usage, and effect. If there are multiple player interaction devices able to affect the same player action involving skill, then all such options shall be clearly explained to the player.

4.11 Peer-to-Peer (P2P) Gaming

4.11.1 P2P Gaming Sessions

Peer-to-Peer (P2P) gaming sessions are environments which offer players the opportunity to play with and against each other. In these environments, the operator usually does not engage in the P2P gaming session as a party (e.g., house-banked gaming), but usually provides the environment for use by its players, and may take a rake, commission, or fee for the service. The following requirements apply:

a) Players shall be prevented from occupying more than one position in any P2P gaming session unless authorized by the rules of the game;
b) Players shall be provided with the option to join a P2P gaming session where all players have been selected at random;
c) Any players that are playing with house money (shills) or are proposition players shall be clearly indicated to all other players in that P2P gaming session; and
d) Players shall be provided with warnings where the use of bots or other unauthorized player software can affect play so that they can make an informed decision whether to participate.

4.11.2 P2P Advantage Feature

A P2P gaming session may contain a feature that allows a player or players to gain an advantage over other players provided that the game:

a) Clearly describes to all players that the feature is available and the advantage it offers;
b) Discloses the method for obtaining the feature, including any required wager; and
c) Provides players with sufficient information to make an informed decision, prior to game play,

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as to whether or not to compete against other player(s) who may possess such a feature.

4.11.3 "Away from Play" Status

The Gaming Platform shall support an "Away from Play" status which can be triggered either by player request or upon a period of inactivity, which shall be disclosed to the player and be less than or equal to the inactivity timeout period specified under the "Player Inactivity" section of this document. This status shall be fully described in the help screens or applicable gaming rules.

a) The player shall be informed when the "Away from Play" status is triggered.
b) The "Away from Play" status shall disallow all play and cause the player's turn to be automatically skipped during any round of play which takes place while this status is active.
c) If the "Away from Play" status is triggered during the middle of a game, that game shall be treated as an interrupted game and meet the requirements under the section entitled "Completion of Interrupted Games".
d) If a player performs any game sensitive action while in an "Away from Play" status (i.e., selecting an amount to wager, etc.), the status shall be removed, and the player will be enrolled into the next game. Non-game sensitive actions, such as accessing the help menu do not require this status to be removed.
e) If a player has been in "Away from Play" status for more than a period of time disclosed to the player, the player shall be automatically removed from the P2P gaming session they are currently enrolled in.

4.12 Persistence Games

4.12.1 General Statement

A persistence game is associated with a unique attribute (e.g., player ID, game theme/paytable ID, etc.) and incorporates a feature that enables progress towards the award of game play enhancements and/or bonuses through the achievement of some designated game outcome. These additional offerings become available when the player has achieved specific thresholds defined for game play. Each designated outcome advances the state of the persistence game. Multiple plays of a game are usually necessary to trigger the persistence award.

4.12.2 Persistence Game Thresholds

A persistence game shall recognize a particular attribute for the purpose of restoring previously earned thresholds during each subsequent visit to a game. A persistence game shall contain in its help screens, a clear description of each persistence game-related feature and/or function, and the requirements for achieving persistence game thresholds, as well as information regarding how the player restores previously earned thresholds. Additionally, players shall be notified each time a persistence game threshold has been achieved.

4.12.3 Play from Save

Play from save is a feature utilized in some persistence game designs where complexity increases,

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or additional elements are added to the game, as play continues. Additionally, play from save allows the player to save a persistence game at critical points (i.e., save points), typically after some accomplishment or goal has been achieved. The player can resume game play from that point at a later date and continue on to the next goal. The following requirements apply to play from save:

a) Awards issued or made available for reaching a save point shall be clearly defined and displayed to the player prior to placing any wager. If a random type award may be won, the details and all possible payouts shall be displayed to the player;
b) The game shall provide a suitable notification to the player whenever a designated save point is reached during play;
c) If game rules or awards change as different levels are reached during play from save activity, these changes shall be clearly displayed to the player; and
d) If the play from save state is not indefinitely maintained, then the game shall provide an indication to the player of any limitation and/or expiration of saved data that is stored for use in supporting game play at a later period in time.

4.13 Progressive Jackpots and Incrementing Jackpots

4.13.1 General Statement

This section applies to monetary jackpot awards or "payoffs" which increase based on game play as follows:

a) Progressive jackpots awards increase according to the credits wagered in the game.
b) Incrementing jackpots awards behave identically as progressive jackpots, except they increase based on the occurrence of one or more specific conditions (defined events) established by the rules of the game instead of, or in addition to, increases based on credits wagered.

NOTE: This section does not apply to awards of restrictive incentive credits, bonuses/features which offer awards which may increase over a single game cycle or, static awards whose probabilities of triggering change as the game is played. This section also does not apply to persistence game features which increase as the game is played (e.g., number of free games, multipliers, several achievements towards the activation of a bonus/feature or the issuance of an award, etc.) or "levels" of static awards available to be won based on player experience and/or achievements.

4.13.2 Jackpot Display

The jackpot display is used to indicate the current jackpot award amount or "payoff" for each jackpot in credits or the local currency format to all players who are playing a game which may potentially trigger the jackpot. If the jackpot offers a "mystery payoff" where the actual payoff is not displayed to the player, the "Mystery Award Features" shall apply.

a) As games are played, the current payoff for each jackpot shall be updated on the jackpot display at least every thirty seconds from the incrementing game event to reasonably reflect the actual size of the payoff. The use of odometer and other "paced" updating displays are allowed.
b) Where the jackpot display has a maximum display limitation (i.e., it could only display a certain

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number of digits), a maximum payoff limit or "ceiling" shall be required and shall meet the requirements for "Maximum Payoff Limits".

NOTE: The payoff(s) shall be displayed as accurately as possible within the constraints of communication delays and latencies.

4.13.3 Maximum Payoff Limits

If a maximum payoff limit or "ceiling" is supported by the jackpot, once the payoff reaches its ceiling, it shall remain at that value until awarded to a player.

a) Where required by the regulatory body, all additional contributions shall be credited to an overflow or diversion pool.
b) Where disclosed to the player in the artwork, the displayed ceiling amount shall be accurate.

4.13.4 Linked Odds

For jackpots linked to multiple game themes, unless otherwise clearly disclosed to the player, the probability of winning the linked jackpot shall be proportional to the player's monetary wager.

NOTE: For the purposes of this requirement, a variance is acceptable of no greater than five percent (5%) for probability and no greater than a one percent (1%) tolerance on the expected RTP calculation.

4.13.5 Jackpot Diversion

Where allowed by the regulatory body, a Jackpot Diversion Scheme may be used, where a portion of the jackpot contributions are diverted to another pool or "diversion pool" to be used as needed by the design of the jackpot (e.g., the diversion pool may be added to the reset value of the next jackpot or be used to pay simultaneous wins of a jackpot).

a) A Jackpot Diversion Scheme shall be able to be implemented such that it does not have a mathematical expectation of infinity.
b) Diversion pools shall not be truncated. Diverted contributions once that diversion pool has reached its upper limit shall be accounted for.
c) Where a diversion pool is used to fund the reset value of a jackpot, the reset value shall assume an empty diversion pool for the purposes of RTP calculations.

4.13.6 Jackpot Wins

Jackpots may be awarded based on obtaining winning symbols, or by other criteria, such as mystery-triggered jackpots, bad-beat jackpots, etc. When a jackpot is triggered:

a) A winning player shall be notified of a jackpot win, and its payoff, by the end of the game in play.
b) Contributions toward the jackpot shall not be lost. Jackpot payoffs when awarded shall not be rounded down or truncated unless carried over to the reset amount.
c) When in use, the jackpot payoff may be added to the player's credit meter if either:

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i. The credit meter is maintained in the local currency amount format;
ii. The jackpot payoff is incremented in whole credit amounts; or
iii. The jackpot payoff in local currency amount format is converted properly to credits upon transfer to the credit meter in a manner that does not mislead the player.

d) The jackpot payoff shall update to the reset value and continue normal operations.

NOTE: A jackpot may be disabled or decommissioned concurrent with the winning of the jackpot if the game was configured to automatically disable or establish in its place an award which does not increment.

4.13.7 Swapping Jackpot Levels

For jackpots offering multiple levels of awards, when a single winning combination may be evaluated as more than one of the available paytable combinations, unless otherwise explicitly defined in the game rules, the player shall always be paid the highest possible value based on all combinations to which the outcome may correlate (e.g., if "Jackpot A" is awarded for five aces on a payline and "Jackpot B" is awarded for four aces on a payline, and "Jackpot B" has a larger award than "Jackpot A", the player shall be awarded the payoff for "Jackpot B" if the player obtains an outcome of five aces on a payline).

4.13.8 Mystery-Triggered Jackpots

For mystery-triggered jackpots which use a hidden trigger amount to determine the when the jackpot is awarded:

a) The hidden trigger amount shall be set randomly upon each jackpot reset and shall remain unknown at all times; and
b) It shall not be possible to gain access to or knowledge of the hidden trigger amount at any time.

4.13.9 Jackpot Triggers for Multiple Players

The Gaming Platform shall be designed to accurately identify and record the order of triggers when multiple players trigger at nearly the same time, such that the full amount of the displayed payoff can be awarded to winning player who triggered first. When this is not possible or if it's possible that multiple players trigger at the exact same time (e.g., in a multi-player game), one of the following shall occur:

a) The full amount of the displayed payoff shall be awarded to each winning player; or
b) Accurate information on how the payoff is distributed shall be disclosed to the player.

4.14 Game Recall

4.14.1 Player Facing Recall

A 'game recall' facility shall be provided to the player, either as a re-enactment or by description. The 'game recall' facility shall clearly indicate that it is a replay of the previous game.

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4.14.2 Last Play Information Required

Game recall shall consist of graphical, textual, or video content, or some combination of these options, or other means (e.g., "flight recorder" mechanism), so long as the full and accurate reconstruction of game outcome and/or player actions is possible. It is allowable to display values in currency in place of credits. Game recall shall display the following information as applicable:

a) The date and time the game was played;
b) The denomination played for the game, if a multi-denomination game type;
c) The display associated with the final outcome of the game, either graphically or via a clear text description;
d) The funds available for wagering at the start of play and/or at the end of play;
e) Total amount wagered, including any incentive credits;
f) Total amount won, including:
   i. Any incentive credits and/or prizes;
   ii. Any progressive jackpots and/or incrementing jackpots;
g) Any non-wager purchase that occurred between the start of play and the end of play;
h) Rake, commission, or fees collected;
i) The results of any player choices involved in the game outcome;
j) The results of any intermediate game phases, such as double-up/gamble or bonus/feature games;
k) If a progressive jackpot and/or incrementing jackpot was won, an indication that the jackpot was awarded; and
l) Any player advice that is offered to the player for games with skill.

4.14.3 Bonus/Feature Game Recall

Game recall shall reflect at least the last fifty events of completed bonus/feature games. If a bonus/feature game consists of 'x number of events,' each with separate outcomes, each of the 'x events', up to fifty, shall be displayed with its corresponding outcome, regardless of whether the result was a win or loss.

4.15 Disable Requirements

4.15.1 Game Disable

When a game or gaming activity is disabled by the Gaming Platform while a game is in progress, all players playing that game shall be permitted to conclude their current game in play (i.e., bonus rounds, double-up/gamble and other game features related to the wager shall be fully concluded right away or the next time that game becomes available to the player). Once the game has fully concluded it shall no longer be accessible to a player.

4.15.2 Jackpot Disable

For cases where a progressive jackpot or incrementing jackpot is disabled (e.g., operator intervention, error condition, time limit has expired, etc.), the following requirements shall apply:

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a) An indication shall be displayed when the jackpot is not available;
b) It shall not be possible for the jackpot to be incremented or won while in this state; and
c) Upon resumption of the jackpot from the disabled state, it shall be possible to return the jackpot with the identical parameters as before the disable, including the payoff. The hidden trigger amount, if used to determine jackpot win for a mystery-triggered jackpot, may only be reselected if the reselected amount is in the range of the current payoff to the ceiling.

NOTE: For house-banked games, it is recommended that if the minimum percentage requirement as specified within the "Software Requirements for Percentage Payout" section is no longer met when the jackpot is not available, the participating games shall also be disabled.

4.16 Interrupted Games

4.16.1 Interrupted Games

A game is considered interrupted when the game outcome remains unresolved or the outcome cannot be properly conveyed to the player. Interrupted games may result from the following occurring during game play:

a) Loss of communications between the Gaming Platform and the Remote Player Device;
b) A Gaming Platform restart;
c) A Remote Player Device restart or malfunction;
d) Abnormal termination of the Player Software; or
e) A game-disable command by the Gaming Platform.

4.16.2 Wagers in Interrupted Games

Wagers associated with an interrupted game that can be continued shall be held by the Gaming Platform until the game completes. Player accounts shall reflect any funds held in interrupted games.

4.16.3 Completion of Interrupted Games

The Gaming Platform shall provide a mechanism for a player to complete an interrupted game. An interrupted game shall be resolved before a player is permitted to participate in another instance of the same game.

a) Where no player input is required to complete the game, it is acceptable for the game to return to a game completion state, provided the game history and the credit meter or player account balance reflects a completed game.
b) For single-player games, where player input is required to complete the game, the game shall return the player to the game state immediately prior to the interruption and allow the player to complete the game, unless any superseding game rules and/or terms and conditions for game recovery is disclosed to the player.
c) For multi-player games, where player input is required to complete the game and the player

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cannot complete an action required of them to allow a game to continue within the allotted time:

i. The Gaming Platform shall complete the game on behalf of the player in accordance with the game rules and/or terms and conditions;
ii. The game history and credit meters or player account balances shall be updated accordingly;
iii. The results of the game shall be available to the player and shall indicate which decisions, if any, were made by the Gaming Platform on behalf of the player; and
iv. The Gaming Platform shall be designed such that one player not completing an action in the required time shall not impact any other players in the same gaming session with regards to completing the game and being credited for wins or debited for losses.

4.17 Virtual Event Wagering

4.17.1 General Statement

Virtual event wagering allows for the placement of wagers on simulations of sporting events, contests, and races whose results are based solely on the output of an approved Random Number Generator (RNG) as allowed by the regulatory body. Gaming Platforms which support virtual event wagering shall meet the requirements specified for "Virtual Event Wagering" within the *GLI-33 Standards for Event Wagering Systems*. In addition, the RNG utilized for virtual event wagering shall comply with applicable "Random Number Generator (RNG) Requirements" of this document.

4.18 Live Game Requirements

4.18.1 General Statement

Where authorized by a regulatory body, the following requirements apply where wagers are placed through a Gaming Platform on live games conducted by a gaming attendant (e.g., dealer, croupier, etc.) and/or other gaming equipment (e.g., automated roulette wheel, ball blower, gaming device, etc.) in a live game environment. This includes, but is not limited to live drawings, live card games, live table games, live keno games, live bingo games, and live play of gaming devices or other games as allowed by the regulatory body.

a) The entire process is viewed by all players through real-time remote audio and video feed using streaming, narrowcast, broadcast or other technology and a graphical interface.
b) The Gaming Platform receives instructions from each player through the player interface or another communication channel to facilitate player decisions where required.
c) In addition to the requirements contained within this section, the operator or third-party service provider maintaining these components, services and/or applications shall meet the operational procedures and controls indicated in the "Live Game Services" section of this document.

NOTE: Where authorized by a regulatory body, a live game service provider may utilize a surrogate to place wagers on behalf of a player instead of directly through a system. Such implementations, when used in conjunction with a Gaming Platform, will be reviewed on a case by case basis.

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4.18.2 Live Game Information

A live game shall conform to the applicable display requirements found in related sections of this standard for "Game Information and Rules of Play", "Information to be Displayed", and "Game Fairness". In addition, the following display requirements apply:

a) The Gaming Platform shall provide information to the player which:
   i. Describes procedures in place to deal with live game interruptions caused by the discontinuity of data flow, video and voice from the network server during a game (e.g., internet connection outage, simulcast control server malfunction, etc.);
   ii. Indicates the possibility of human error by the gaming attendant and system error by the specialized device and how errors are resolved; and
   iii. Identifies any correlation between the player's wager selection through the Gaming Platform and what will be displayed in the video feed, such as physical player chips and their values.
b) The Gaming Platform may not provide any real time information, for the current live game being played, that can be used to aid in:
   i. Projecting or predicting the outcome of a game;
   ii. For card games, tracking the cards played and cards remaining to be played;
   iii. Analyzing the probability of the occurrence of an event relating to a game; or
   iv. Analyzing the strategy for playing or wagering to be used in a game, unless allowed by the rules of the game.
c) Players shall be informed for any live game relying on 'live' monitoring of an event (e.g., bingo) that 'live' transmissions may be subject to delay or interruption. Where a delay is apparent or created by the Gaming Platform, the scale of the delay shall be displayed to the player.

4.18.3 Player Fairness in Live Games

The following rules apply when players participate in games through the Gaming Platform with in-person players, who are playing at the actual game in a gaming venue (e.g., casino, bingo hall, card room, etc.):

a) The rules, artwork and functionality of the live game, as made available to the player through the Gaming Platform, shall include no more or no less information than that which is made available to an in-person player, where applicable; and
b) Players who are playing through a Gaming Platform shall be no more or no less eligible to win the game than in-person players.

NOTE: Nothing herein may preclude the possibility of implementing specific incentive awards only for in-person players or players who are playing through a Gaming Platform.

4.18.4 Game Outcome Data

Game outcome data refers to any result generated or detected by specialized devices during the live game up to and including the result of the player's wager including any intermediate phases that

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impact the result, as determined by the Gaming Platform. Game outcome data shall be transmitted to the player immediately following its generation or detection (subject to the natural limitations of system processing and Internet communication delays). If allowed by the regulatory body, game outcome data may be automatically registered by specialized devices, provided that the software used for automated recognition shall:

a) Ensure a very high degree of accuracy in identifying and reporting the game outcome data to the Gaming Platform. The rules of the game shall be programmed into the Gaming Platform;
b) Not provide any information that may be used to compromise the device and its components (e.g., cards contained in the current shuffle or dealing shoe);
c) Not interfere with or modify the device's behavior beyond what functionality is associated with that software; and
d) Include a manual operation mode to allow for corrections of an erroneous result (where the device misreads a card, the position of the ball, etc.) if such corrections are not done directly on the Gaming Platform. The player shall be made aware that the manual operation mode is in use.

4.18.5 Physical Randomness Devices

Live games may utilize physical randomness devices, as described within the "Mechanical RNG (Physical Randomness Device)" section of this document, to generate game outcomes.

a) Physical randomness device outcomes shall be digitized into game outcome data and securely transmitted to the Gaming Platform via specialized devices for processing without alterations unless approved by the regulatory body.
b) Game outcome data shall be recorded by the Gaming Platform and made available to the player for review immediately following its generation (subject to the natural limitations of system processing and network communication delays).
c) Except for a human error or an error correctable with a manual override, at any time during the game the game outcome data shall match the outcome generated by the physical randomness device. Where a discrepancy between the physical randomness device and the game outcome data exists, the physical randomness device's outcome shall be considered correct.

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Appendix A: Operational Audit for Gaming Procedures and Practices

A.1 Introduction

A.1.1 General Statement

This appendix sets forth procedures and practices for gaming operations which will be reviewed in an operational audit as a part of the Interactive Gaming System evaluation, including, but not limited to establishing gaming rules, managing games, monitoring games and Random Number Generator (RNG) output, handling various gaming and financial transactions, creating and managing progressive jackpots and incrementing jackpots, player account management, fundamental practices relevant to the limitation of risks, and any other objectives established by the regulatory body.

NOTE: It is also recognized that additional procedures and practices which are not specifically included within this standard will be relevant and required for an operational audit as determined by the operator and/or regulatory body within their rules, regulations, and Minimum Internal Control Standards (MICS).

A.2 Internal Control Procedures

A.2.1 Internal Control Procedures

The operator shall establish, maintain, implement and comply with internal control procedures for gaming operations, including performing gaming and financial transactions.

A.2.2 Information Management

The operator's internal controls shall include the processes for maintaining the recorded information specified under the section entitled "Information to be Maintained" for a period of five years or as otherwise specified by the regulatory body.

A.2.3 Risk Management

The operator's internal controls shall contain details on its risk management framework, including but not limited to:

a) Automated and manual risk management procedures;
b) Employee management, including access controls and segregation of duties;
c) Information regarding identifying and reporting fraud and suspicious conduct;
d) Controls ensuring regulatory compliance;
e) Description of Anti-Money Laundering (AML) compliance standards, including procedures for detecting structuring to avoid reporting requirements;
f) Description of all software applications that comprise the Interactive Gaming System;
g) Description of all types of games available to be offered by the operator;
h) Description of the method to prevent collusion for peer-to-peer games;

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i) Description of all integrated third-party service providers; and
j) Any other information required by the regulatory body.

A.2.4 Restricted Players

The operator's internal controls shall describe the method to prevent game play from people identified as employees, subcontractors, directors, owners, and officers of an operator, as well as those within the same household as required by the regulatory body.

A.2.5 Test Accounts

The operator may establish test accounts to be used to test or have tested the various components and operation of an Interactive Gaming System in accordance with internal controls adopted by the operator, which, at a minimum, shall address the following procedures:

a) The procedures for authorizing testing activity and assigning each test account for use;
b) The procedures for the issuance of funds used for testing, including the identification of who is authorized to issue the funds and the maximum amount of funds that may be issued;
c) The maintenance of a record for all test accounts, to include when they are active and to whom they are issued; and
d) The procedures for the auditing of testing activity to ensure the accountability of funds used for testing and proper adjustments to reports and records.

A.3 Player Account Controls

A.3.1 Registration and Verification

Where player account registration is done manually by the operator, procedures shall be in place to satisfy the requirements for "Registration and Verification" as indicated within this document.

A.3.2 Fraudulent Accounts

The operator shall have a documented public policy for the treatment of player accounts discovered to being used in a fraudulent manner, including but not limited to:

a) The maintenance of information about any account's activity, such that if fraudulent activity is detected, the operator has the necessary information to take appropriate action;
b) The suspension of any account discovered to be engaged in fraudulent activity, such as a player providing access to underage persons; and
c) The handling of deposits, wagers, and wins associated with a fraudulent account.

A.3.3 Terms and Conditions

A set of terms and conditions shall be available to the player. During the registration process and when any terms and conditions are materially updated (i.e., beyond any grammatical or other minor changes), the player shall agree to the terms and conditions. The terms and conditions shall:

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a) State that only individuals legally permitted by their respective jurisdiction can participate in gaming;
b) Advise the player to keep their authentication credentials (e.g., password and username) secure;
c) Disclose all processes for dealing with lost authentication credentials, forced password changes, password strength and other related items as required by the regulatory body;
d) Specify the conditions under which an account is declared inactive and explain what actions will be undertaken on the account once this declaration is made;
e) Clearly define what happens to the player's wagers placed but remaining undecided in interrupted games prior to any self-imposed or operator-imposed exclusion, including the return of all wagers, or settling all wagers, as appropriate;
f) Contain information about timeframes and limits regarding deposits to and/or withdrawals from the player account, including a clear and concise explanation of all fees (if applicable);
g) State that the operator has the right to:
    i. Refuse to establish a player account for what it deems good and sufficient reason;
    ii. Refuse deposits to and/or withdrawals from player accounts for what it deems good and sufficient reason; and
    iii. Unless there is a pending investigation or player dispute, suspend or close any player account at any time pursuant to the terms and conditions between the operator and the player.

A.3.4 Privacy Policy

A privacy policy shall be available to the player. During the registration process and when the privacy policy is materially updated (i.e., beyond any grammatical or other minor changes), the player shall agree to the privacy policy. The privacy policy shall state:

a) The personally identifiable information (PII) required to be collected;
b) The purpose and legal basis for PII collection and of every processing activity for which consent is being sought including, where required by the regulatory body, the "legitimate interest" pursued by the operator (or third-party service provider(s)) if this is the legal basis chosen (i.e., identification of the specific interest in question);
c) The period in which the PII is stored, or, if no period can be possibly set, the criteria used to set this. It is not sufficient for the operator to state that the PII will be kept for as long as necessary for the legitimate purposes of the processing;
d) The conditions under which PII may be disclosed;
e) An affirmation that measures are in place to prevent the unauthorized or unnecessary disclosure of the PII;
f) The identity and contact details on the operator who is seeking the consent, including any third-party service provider(s) which may access and or use this PII;
g) Where required by the regulatory body, that the player has a right to:
    i. Access, export, or transfer their PII;
    ii. Rectify, erase, or restrict access to their PII;
    iii. Object to the PII processing;
    iv. To withdraw consent, if the processing is based on consent;

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h) The rights and possibility of a player to file a complaint to the regulatory body;
i) For PII collected directly from the player, whether there is a legal or contractual obligation to provide the PII and the consequences of not providing that PII;
j) Where applicable and required by the regulatory body, information on the operator's use of automated decision-making, including profiling, and at least in those cases, without hindering compliance with other legal obligations:
    i. Sufficient insight into the logic of the automated decision-making;
    ii. The significance and the envisaged consequences of such processing for the player; and
    iii. Safeguards in place around solely automated decision-making, including information for a player on how to contest the decision and to require direct human review or intervention.

A.3.5 Personally Identifiable Information (PII) Security

Any information obtained in respect to the player account, including personally identifiable information (PII) and authentication credentials, shall be done in compliance with the privacy policy and local privacy regulations and standards observed by the regulatory body. Both PII and the player funds shall be considered as critical assets for the purposes of risk assessment.

a) Any PII which is not subject to disclosure pursuant to the privacy policy shall be kept confidential, except where the release of that information is required by law. This includes, but is not limited to:
    i. The amount of money credited to, debited from, or present in any particular player account;
    ii. The amount of money wagered by a particular player on any game;
    iii. The account number and authentication credentials that identify the player; and
    iv. The name, address, and other information in the possession of the operator that would identify the player to anyone other than the regulatory body or the operator.
b) There shall be procedures in place for the security and sharing of PII, funds in a player account and other sensitive information as required by the regulatory body, including, but not limited to:
    i. The designation and identification of one or more employees having primary responsibility for the design, implementation and ongoing evaluation of such procedures and practices;
    ii. The procedures to be used to determine the nature and scope of all information collected, the locations in which such information is stored, and the storage devices on which such information may be recorded for purposes of storage or transfer;
    iii. The measures to be utilized to protect information from unauthorized access; and
    iv. The procedures to be used in the event the operator determines that a breach of data security has occurred, including required notification to the regulatory body.
c) Where required by the regulatory body, players shall be provided with a method to request:
    i. Confirmation that their PII is being processed;
    ii. Access to a copy of their PII as well as any other information about the PII processing;
    iii. Updates to their PII; and
    iv. Their PII erased and/or to impose restrictions on processing of PII.
d) There shall be procedures in place to record and process such requests from players, including maintaining records of such requests and providing reasons to the player when such requests are denied or rejected. The player shall be given a reason when the operator does not intend to comply with the request and also provided with the necessary information on the possibility to

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file a complaint with the regulatory body.

e) Where required by the regulatory body and upon player's request, the operator shall forward to the players the PII which they have received from the same player, in a structured, commonly used and machine-readable format and transmit those data to another operator, where it is technically feasible to do so. This only applies to:
   i. PII which the player has provided to the operator or PII which is processed by automated means (i.e., this would exclude any paper records); and
   ii. Cases where the basis for processing is PII consent, or that the data is being processed to fulfil a contract or steps preparatory to a contract.

f) Where required by the regulatory body, the player has the right to object to PII processing:
   i. Based on legitimate interests or the performance of a task in the public interest or in the exercise of official authority;
   ii. Used in direct marketing, including profiling to the extent that it is related to such marketing activities; and
   iii. For scientific or historical research purposes or for the purpose of statistics.

g) There shall be procedures in place for the operator to comply with requests from players to have PII erased and/or to prevent or restrict processing of PII, including, in the following circumstances:
   i. Where the PII is no longer necessary in relation to the purpose for which it was originally collected/processed;
   ii. When the player withdraws consent;
   iii. When the player objects to the PII processing and there is no overriding legitimate interest for continuing the processing;
   iv. The PII was unlawfully processed; or
   v. The PII has to be erased in order to comply with a legal obligation.

h) Where prohibited by the regulatory body, the operator may not utilize solely automated decision-making which:
   i. Produces legal effects the player such as those which result in the player being subjected to surveillance by a competent authority; or
   ii. Significantly affects the player in a similar manner (e.g., it has the potential to influence the circumstances, behavior or choices of the player).

A.3.6 Player Funds Maintenance

Procedures shall be in place to ensure all financial transactions are conducted in accordance with local commerce regulations and requirements mandated by the regulatory body.

a) Where financial transactions cannot be performed automatically by the Interactive Gaming System, procedures shall be in place to satisfy the requirements for "Financial Transactions" as indicated within this document.

b) Where financial transactions are allowed through Electronic Funds Transfers (EFT), the operator shall have security measures and controls to prevent EFT fraud. A failed EFT attempt may not be considered fraudulent if the player has successfully performed an EFT on a previous occasion with no outstanding chargebacks. Otherwise, the operator shall do all of the following:
   i. Temporarily block the player account for investigation of fraud after five consecutive failed EFT attempts within a ten-minute time period or a period to be determined by the

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regulatory body. If there is no evidence of fraud, the block may be removed; and
ii. Suspend the player account after five additional consecutive failed EFT attempts within a ten-minute period or a period to be determined by the regulatory body.

c) Positive player identification or authentication shall be completed before the withdrawal of any funds can be made by the player.
d) The operator shall not allow a player account to be overdrawn unless caused by payment processing issues outside the control of the operator.
e) A player's request for withdrawal of funds (i.e., deposited and cleared funds and wagers won) shall be completed by the operator within a reasonable amount of time, unless there is a pending unresolved player complaint/dispute or investigation. Such investigation shall be documented by the operator and available for review by the regulatory body.
f) The operator shall have security or authorization procedures in place to ensure that only authorized adjustments can be made to player accounts, and these changes are auditable.

A.3.7 Limitations

Players shall be provided with a method to impose limitations for gaming parameters including, but not limited to deposits and wagers as required by the regulatory body. In addition, there shall be a method for the operator to impose any limitations for gaming parameters as required by the regulatory body.

a) Once established by a player and implemented by the operator, it shall only be possible to reduce the severity of self-imposed limitations upon twenty-four hours' notice, or as required by the regulatory body.
b) Players shall be notified in advance of any operator-imposed limits and their effective dates. Once updated, operator-imposed limits shall be consistent with what is disclosed to the player.
c) Upon receiving any self-imposed or operator-imposed limitation order, the operator shall ensure that all specified limits are correctly implemented immediately or at the point in time (e.g., next login, next day) clearly indicated to the player.

A.3.8 Exclusions

Players shall be provided with a method to exclude themselves from gaming for a specified period or indefinitely, as required by the regulatory body. In addition, there shall be a method for the operator to exclude a player from gaming as required by the regulatory body.

a) Players shall be given a notification containing exclusion status and general instructions for resolution where possible.
b) Immediately upon receiving the exclusion order, no new wagers or deposits are accepted from that player, until the exclusion has been removed.
c) While excluded, the player shall not be prevented from withdrawing any or all of their account balance, provided that the operator acknowledges that the funds have cleared, and that the reason(s) for exclusion would not prohibit a withdrawal.
d) All advertising or marketing material shall not specifically target players that have been excluded from play.

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A.3.9 Inactive Accounts

A player account is considered to be inactive under the conditions as specified in the terms and conditions. Procedures shall be in place to:

a) Allow access by player to their inactive account only after performing additional identity verification;
b) Protect inactive player accounts that contain funds from unauthorized access, changes or removal; and
c) Deal with unclaimed funds from inactive player accounts, including returning any remaining funds to the player where possible.

A.3.10 Account Closure

Players shall be provided with a method to close their player account at any time unless the operator has temporarily excluded a player from gaming. Any balance remaining in a player account shall be refunded to the player, provided that the operator acknowledges that the funds have cleared.

A.4 General Operating Procedures

A.4.1 Operator Reserves

The operator shall have processes in place for maintaining and protecting adequate cash reserves, as determined by the regulatory body, including segregated accounts of funds held for player accounts and any operational funds used to cover all other operator liability if defined by the regulatory body.

A.4.2 Protection of Player Funds

The operator shall have processes in place to ensure funds in an operator account are either to be held in trust for the player in a segregated account or in a special purpose segregated account that is maintained and controlled by a properly constituted corporate entity that is not the operator and whose governing board includes one or more corporate directors who are independent of the operator and of any corporation related to or controlled by the operator. In addition, the operator shall have procedures that are reasonably designed to:

a) Ensure that funds generated from gaming are safeguarded and accounted for;
b) Make clear that the funds in the segregated account do not belong to the operator and are not available to creditors other than the player whose funds are being held; and
c) Prevent commingling of funds in the segregated account with other funds including, without limitation, funds of the operator.

A.4.3 Taxation

The operator shall have a process in place to identify all wins that are subject to taxation (single

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wins or aggregate wins over a defined period as required) and provide the necessary information in accordance with each regulatory body's taxation requirements.

NOTE: Amounts won that exceed any jurisdictional specified limit shall require the appropriate documentation to be completed before the winning player is paid.

A.4.4 Complaint/Dispute Process

The operator shall provide a method for a player to make a complaint/dispute, and to enable the player to notify the regulatory body if such complaint/dispute has not been or cannot be addressed by the operator, or under other circumstances as specified by the law of the regulatory body.

a) Players shall be able to log complaints/disputes on a 24/7 basis.
b) Records of all correspondence relating to a complaint/dispute shall be maintained for a period of five years or as otherwise specified by the regulatory body.
c) A documented process shall exist between the operator and the regulatory body on the complaint/dispute reporting and resolution process.

A.4.5 Player Protection Information

Player protection information shall be available to the player. The player protection information shall contain at a minimum:

a) Information about potential risks associated with excessive gaming, and where to get help for a gambling problem;
b) A statement that no underage persons are permitted to participate in gaming;
c) A list of the available player protection measures that can be invoked by the player, such as self-imposed exclusion, and information on how to invoke those measures;
d) Mechanisms in place which can be used to detect unauthorized use of their account, such as reviewing financial statements against known deposits;
e) Contact information or other means for reporting a complaint/dispute; and
f) Contact information for the regulatory body and/or a link to their website.

NOTE: All links to problem gambling services provided by third parties are to be regularly tested by the operator. Interactive gaming may not occur where the links used to supply information on player protection are not displayed or are not operational. Where the link is no longer available or not available for a significant period of time, the operator shall provide an alternative support service.

A.4.6 Responsible Gaming

The operator shall have policies and procedures in place which facilitate interaction with players whenever their gaming behavior indicates a risk of the development of a gambling problem. Employees interacting directly with players shall be trained to ensure they understand problem gambling issues and know how to respond to them.

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A.4.7 Chat Features

A defined procedure shall exist for cases where the operator provides for the use of chat features which allow the player to communicate directly with the operator and/or other players, including maintaining chat logs for a period of ninety days or as required by the regulatory body. In addition, email correspondence between the player and the operator shall also be maintained for the same amount of time.

A.5 Gaming Rules and Content

A.5.1 Gaming Rules

Gaming rules refers to any written, graphical, and auditory information provided to the public regarding gaming operations. The operator shall adopt and adhere to comprehensive gaming rules which shall be approved by the regulatory body.

a) Gaming rules shall be complete, unambiguous, and not misleading or unfair to the player.
b) Gaming rules that are presented aurally (via sound or voice) shall also be displayed in written form.
c) Gaming rules shall be rendered in a color that contrasts with the background color to ensure that all information is clearly visible/readable.
d) The operator shall keep a log of any changes to the gaming rules relating to playing games.
e) Where gaming rules are altered for games being offered, all rule changes shall be time and date stamped showing the rule applicable in each period. If multiple rules apply to a game, the operator shall apply the rules that were in place when the wager was accepted.

A.5.2 Gaming Rules Content

The following information shall be made available to the player. The functionality to display the information required by this section shall be displayed by the player interface or from a page accessible to the player:

a) The methods of funding a player account (e.g., cash, personal check, cashier's check, wire transfer, money order, debit instrument, credit card, electronic funds transfer, etc.), including a clear and concise explanation of all fees (if applicable);
b) As allowed by the regulatory body, any prizes that are offered in the form of merchandise, annuities, lump sum payments, or payment plans instead of cash payouts for each game that is offering such a prize;
c) The procedures by which any unrecoverable malfunctions of hardware/software are addressed including if this process results in the voiding of any pays or plays;
d) The procedures to deal with interruptions caused by player disconnection from the Gaming Platform where the result of a game is affected by the time to respond to a game event;
e) What happens to the player's wagers placed but remaining undecided in interrupted games including how they are handled when they remain undecided beyond the specified time period;
f) A description on restricted players, including any applicable limitations on participation for them;

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g) For each progressive jackpot or incrementing jackpot:
   i. The imperfections of the communications medium for the game, and how it may affect players in relation to the jackpot;
   ii. Any maximum payoff limit or "ceiling" and/or time limit which is supported by the jackpot;
   iii. How the jackpot is funded and determined; and
   iv. Any planned or unplanned decommissions of the jackpot, including how any outstanding contribution amounts are dealt with in order to ensure player fairness.

A.5.3 Incentive Award Offers

An operator may offer incentive awards, which are credits and/or prizes not included in the paytable of a game and are based upon predetermined events or criteria established by the parameters of the Interactive Gaming System.

a) Players shall be able to access clear and unambiguous terms in the gaming rules pertaining to any available incentive award offers, which shall include the following at a minimum:
   i. The date and time presented;
   ii. The date and time the offer is active and expires;
   iii. Player eligibility, including any limitations on participation;
   iv. Any restriction or terms on withdrawals of funds;
   v. Wagering requirements and limitations by type of game, game theme and/or paytable;
   vi. How the player is notified when they have received an incentive award;
   vii. The order in which funds are used for wagers; and
   viii. Rules regarding cancellation.
b) An operator shall provide a clear and conspicuous method for a player to cancel their participation in an incentive award offer that utilizes restricted incentive credits.
   i. Upon request for cancellation, the operator shall inform the player of the amount of unrestricted player funds that will be returned upon cancellation and the value of restricted incentive credits that will be removed from the player account.
   ii. If the player elects to proceed with cancellation, unrestricted player funds remaining in a player account shall be returned in accordance with the terms of the offer.
c) Once a player has met the terms of an incentive award offer, the operator shall not limit winnings earned while participating in the offer (i.e., the restricted incentive credits of the offer will become unrestricted incentive credits).

A.5.4 Contests/Tournaments

A contest/tournament, which permits a player to either purchase or be awarded the opportunity to engage in competitive gaming against other players, may be permitted provided the following rules are met:

a) Rules shall be made available to a player for review in the gaming rules prior to contest/tournament registration. The rules shall include at a minimum:
   i. All conditions registered players shall meet to qualify for entry and advancement through, the contest/tournament;
   ii. Specific information pertaining to any single contest/tournament, including the available

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prizes or awards and distribution of funds based on specific outcomes; and
iii. The name of the organization (or persons) that conducted the contest/tournament on behalf of, or in conjunction with, the operator, if applicable.

b) Procedures shall be in place to record the results of each contest/tournament and make publicly available for the registered players to review for a reasonable period of time. Subsequent to being posted publicly, the results of each contest/tournament shall be made available upon request. The results include the following:
   i. Name of the contest/tournament;
   ii. Date(s)/times(s) of the contest/tournament;
   iii. Total number of entries;
   iv. Amount of entry fees;
   v. Total prize pool; and
   vi. Amount paid for each winning category.

NOTE: For free contests/tournaments (i.e., registered player does not pay an entry fee), the information required by the above shall be recorded except for the number of entries, amount of entry fees and total prize pool.

A.6 Gaming Procedures and Controls

A.6.1 Evaluating Theoretical and Actual Return to Player Percentages

The operator shall maintain accurate and current documentation (e.g., PAR sheets) indicating the theoretical return to player (RTP) percentages for each house-banked game based on adequate levels of credits wagered, as well as the number of credits that may be played, the payout schedule and other information descriptive of the particular type of game. In addition:

a) Records shall be maintained for each game indicating the initial theoretical RTP percentage, dates and type of changes made affecting the game's theoretical RTP percentage, and the recalculation of theoretical RTP percentage because of the changes.
b) Each change to a game's theoretical RTP percentage, including adding and/or changing progressive jackpot or incrementing jackpot increments, shall result in that game being treated as new for all reports and records.
c) If incentive awards are included in the reports and records for the game, it shall be in a manner that prevents distorting the actual RTP percentages of the affected paytables.
d) The operator shall have procedures in place to periodically compare the theoretical and actual RTP percentage to identify, investigate, and resolve large variances between these two values.

A.6.2 Monitoring Game and RNG Output

The operator shall have procedures in place for monitoring the game and RNG output on a defined periodic or volume basis as required by the regulatory body. The purpose of monitoring is early detection of abnormal behavior enabling timely appropriate remedial action. Any abnormalities (e.g., the actual RTP percentage for the period falling outside the expected range) shall result in an error being logged and escalated for investigation. Best practice monitoring will include independent mapping between RNG output and game symbols should verify game symbol usage.

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RNG output game symbols logs may be maintained and verified as a monitoring exercise.

A.6.3 Disabling Gaming

There shall be established procedures for disabling a game or gaming activity. When a game or gaming activity is disabled, an entry shall be made in an audit log that includes the date and time of disable and its reason.

A.6.4 Interrupted Game Handling

There shall be established procedures for the handling of interrupted games. If a game cannot be continued due to an Interactive Gaming System action, the operator shall:

a) Return all wagers to the player(s) of that game;
b) Update the credit meter(s) or player account balance(s) and game history accordingly;
c) Inform the regulatory body of the circumstances of the incident; and
d) Disable the game if the game is likely to be affected by the same failure.

A.6.5 Progressive Jackpot and Incrementing Jackpot Procedures

The operator shall establish, maintain, implement and comply with internal control procedures for jackpot operations, including the following:

a) Where jackpot contributions are part of the RTP calculations, ensuring the contributions are not assimilated into revenue.
b) Jackpot adjustments and transfers, as supported.
c) For large jackpot awards exceeding a particular value as defined by the regulatory body:
    i. Jackpot verification and payment procedures, including independent reconciliation and operator signoff;
    ii. Payment when multiple jackpot triggers occur and there is no definitive way of knowing which trigger occurred first (unless it's handled automatically by the Interactive Gaming System); and
    iii. Disbursement options for jackpot awards, including information for periodic payments.
d) For jackpots with parameters which are configurable after initial setup, performing independent reconciliation of jackpot contributions and awards to ensure that all jackpot increments deducted:
    i. Have been paid to players as jackpot payoffs;
    ii. Are displayed as part of jackpot payoffs; or
    iii. Are held in separate accounts, which can be demonstrated to be paid to players as part of future jackpot payoffs.
e) Jackpot decommissioning procedures, including procedures for distribution of contributions to another jackpot.

A.7 Procedures and Controls for Peer-to-Peer (P2P) Gaming Sessions

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A.7.1 Shills and Proposition Players

The operator shall have processes to ensure the player is not disadvantaged by players that are playing with house money (shills) or proposition players participating in a P2P gaming session. The following risks are expected to be mitigated:

a) The shills and proposition players shall be clearly indicated to all other players for that P2P gaming session;
b) The operator's controls shall mitigate the conflict between the role of the shill or proposition player and the role of the gaming attendant who has access to the operational environment (both physically and virtually) to be able to manipulate the games or have information not available to all the other players and be able to take advantage of it;
c) The operator shall not profit from the play (beyond the rake);
d) If the shill or proposition player's wager is funded by the operator, neither the operator nor the shill or proposition player may profit from the play, the funds may not be withdrawn, and so shall ultimately be lost/played; and
e) Procedures shall be in place to address the risk that the shill or proposition player is motivated to protect personal wagers beyond the assignment of stimulating play. If the shill or proposition player risks private wagers, then the shill or proposition player shall not have any knowledge of software or other PII (the shill or proposition player is a bona fide independent contractor with no prior relationship with the operator).

A.7.2 P2P Gaming Session Tracking

The operator shall have a process to keep track of all P2P gaming sessions for each player, including tracking:

a) The "Game Play Information" recorded for each game, including their opposing players; and
b) The player's choice of P2P gaming session, as well as instances where the player repeatedly enters and exits P2P gaming sessions without playing until they arrive at their preferred P2P gaming session.

A.7.3 Reporting Suspicious Players

The operator shall provide a method for a player to report suspected cheating, collusion, or usage of bots or other unauthorized player software by others to create an unfair advantage during the P2P gaming session.

A.8 Monitoring Procedures

A.8.1 Monitoring for Collusion and Fraud

The operator shall take measures designed to reduce the risk of collusion or fraud, including having procedures for:

a) Identifying and/or refusing to accept suspicious wagers which may indicate cheating,

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manipulation, interference with the regular conduct of a game, or violations of the integrity of any game on which wagers were made.

b) Reasonably detecting irregular patterns or series of wagers to prevent player collusion in P2P gaming sessions, including the following:
   i. Chip Dumping – Two or more players help each other to stay in the game, leading to losses and therefore to an exchange of chips even with certainly winning combinations;
   ii. Soft-Play – One or more players renounce to play against another player in situations where such behavior is unreasonable in accordance with normal practices of play (e.g., a player leaves the game even if the win is secure);
   iii. Best Hand Play – Between two or more players only the one who has the best score always plays, while the other player(s) leave the game; and
   iv. Chat Collusion – The collusion is achieved through the exchange of relevant information related to the current game or series of games.
c) Reasonably detecting and preventing situations where players in games may be using bots or other unauthorized player software to create an unfair advantage during game play, such as:
   i. Projecting or predicting the outcome of a game;
   ii. For card games, tracking the cards played and cards remaining to be played;
   iii. Analyzing the probability of the occurrence of an event relating to a game; or
   iv. Analyzing the strategy for playing or wagering to be used in a game, unless allowed by the rules of the game.

A.8.2 Anti-Money Laundering (AML) Monitoring

The operator is required to develop and implement AML procedures and policies that adequately address the risks posed by interactive gaming for the potential of money laundering and terrorist financing. At a minimum, the AML procedures and policies shall provide for:

a) A system of internal controls to assure ongoing compliance with the local AML regulations and standards observed by the regulatory body;
b) Up to date training of employees in the identification of unusual or suspicious transactions;
c) Assigning an individual or individuals to be responsible for all areas of AML by the operator including reporting unusual or suspicious transactions;
d) Monitoring player accounts for opening and closing in short time frames and for deposits and withdrawals without associated game play;
e) Ensuring that aggregate transactions over a defined period may require further due diligence checks and may be reportable to the relevant organization(s) if they exceed the threshold prescribed by the regulatory body;
f) Use of any automated data processing systems to aid in assuring compliance; and
g) Periodic independent tests for compliance with a scope and frequency as required by the regulatory body. Logs of all tests shall be maintained.

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Appendix B: Operational Audit for Technical Security Controls

B.1 Introduction

B.1.1 General Statement

This appendix sets forth technical security controls which will be reviewed in an operational audit as a part of the Interactive Gaming System evaluation, including, but not limited to, a review of the operational processes that are critical to compliance, penetration testing focused on the external and internal infrastructure as well as the applications transferring, storing and/or processing personally identifiable information (PII) and/or other sensitive information, and any other objectives established by the regulatory body. The security controls outlined in this appendix apply to the following critical components of the system:

a) Components which record, store, process, share, transmit or retrieve PII and other sensitive information (e.g., validation numbers, authentication credentials, etc.);
b) Components which generate, transmit, or process random numbers used to determine the outcome of games;
c) Components which store results of the current state of a player's wager;
d) Points of entry to and exit from the above components (other systems which communicate directly with core critical systems); and
e) Communication networks which transmit PII and other sensitive information.

NOTE: It is also recognized that additional technical security controls which are not specifically included within this standard will be relevant and required for an operational audit as determined by the operator and/or regulatory body within their rules, regulations, and Minimum Internal Control Standards (MICS).

B.2 System Operation & Security

B.2.1 System Procedures

The operator shall be responsible for documenting and following the relevant Interactive Gaming System procedures and security standards, as required by the regulatory body, including procedures to:

a) Monitor the critical components and the transmission of data of the entire system, including communication, data packets, networks, as well as the components and data transmissions of any third-party services involved, with the objective of ensuring integrity, reliability and accessibility;
b) Maintain all aspects of security of the system to ensure secure and reliable communications, including protection from hacking or tampering;
c) Define, monitor, and document, as well as report, investigate, respond to, and resolve security incidents, including detected breaches and suspected or actual hacking or tampering with the system;
d) Monitor and adjust resource consumption and maintain a log of the system performance,

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including a function to compile performance reports;

e) Investigate, document, and resolve malfunctions, which address the following:
   i. Determination of the cause of the malfunction;
   ii. Review of relevant records, reports, logs, and surveillance records;
   iii. Repair or replacement of the critical component;
   iv. Verification of the integrity of the critical component before restoring it to operation;
   v. Filing an incident report with the regulatory body and documenting the date, time and reason for the malfunction along with the date and time the system is restored; and
   vi. Voiding plays and pays if a full recovery is not possible.

B.2.2 Physical Location of Servers

The Interactive Gaming System server(s) shall be housed in one or more secure location(s) which may be located locally, within a single venue, or may be remotely located outside of the venue as allowed by the regulatory body. In addition, secure location(s) shall:

a) Have sufficient protection against alteration, tampering or unauthorized access;
b) Be equipped with a surveillance system that shall meet the procedures put in place by the regulatory body;
c) Be protected by security perimeters and appropriate entry controls to ensure that access is restricted to only authorized personnel;
   i. Physical access shall have a multi-factor authentication process unless the location is staffed at all times;
   ii. Any attempts at physical access are recorded in a secure log; and
d) Be equipped with controls to provide physical protection against damage from fire, flood, and other forms of natural or manmade disaster (e.g., hurricane, earthquake, etc.).

B.2.3 Logical Access Control

The Interactive Gaming System shall be logically secured against unauthorized access by authentication credentials allowed by the regulatory body, such as passwords, multi-factor authentication, digital certificates, PINs, biometrics, and other access methods (e.g., magnetic swipe, proximity cards, embedded chip cards).

a) Each user account shall have their own individual authentication credential whose provision shall be controlled through a formal process, which shall include periodic review of access rights and privileges. The use of generic accounts shall be limited, and where used the reasons for their use shall be formally documented.
b) Authentication credential records for secret information shall be maintained either manually or by systems that automatically record authentication changes and force authentication credential changes.
c) Any authentication credentials stored on the system shall be either encrypted or hashed to the cryptographic algorithms that meet current industry accepted standards, such as ISO/IEC 19790, FIPS 140-2, or equivalent.
d) A fallback method for resetting authentication credentials (e.g., forgotten passwords) shall be at least as strong as the primary method. A multi-factor authentication process shall be employed

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for these purposes.

e) Lost or compromised authentication credentials and authentication credentials of terminated users shall be deactivated, secured or destroyed as soon as reasonably possible.
f) The system shall have multiple security access levels to control and restrict different classes of access to the server, including viewing, changing or deleting critical files and directories. Procedures shall be in place to assign, review, modify, and remove access rights and privileges to each user, including:
    i. Allowing the administration of user accounts to provide an adequate separation of duties.
    ii. Limiting the users who have the requisite permissions to adjust critical system parameters.
    iii. The enforcement of adequate authentication credential parameters such as minimum length, and expiration intervals.
g) Procedures shall be in place to identify and flag suspect accounts to prevent their unauthorized use, which includes:
    i. Having system administrator notification and user lockout or audit trail entry, after a maximum number of three incorrect attempts at authentication;
    ii. Flagging of suspect accounts where authentication credentials may have been stolen; and
    iii. Invalidating accounts and transferring critical stored account information into a new account.
h) Any logical access attempts to the system applications or operating systems shall be recorded in a secure log.
i) The use of utility programs which can override application or operating system controls shall be restricted and tightly controlled.
j) Restrictions on connection times such as but not necessarily limited to session timeouts shall be used to provide additional security for high-risk applications, such as remote access.

NOTE: Where passwords are used as an authentication credential, it is recommended that they are at least eight characters in length.

B.2.4 User Authorization

The Interactive Gaming System shall implement the following user authorization requirements:

a) A secure and controlled mechanism shall be employed that can verify that the critical component is being accessed by authorized personnel on demand and on a regular basis as required by the regulatory body.
b) When used, automated equipment identification methods to authenticate connections from specific locations and equipment shall be documented and shall be included in the review of access rights and privileges.
c) Any authorization information communicated by the system for identification purposes shall be obtained at the time of the request from the system and not be stored on the system component.
d) Where user sessions are tracked for authorization, the user session authorization information shall always be created randomly, in memory, and shall be removed after the user's session has ended.

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B.2.5 Server Programming

The Interactive Gaming System shall be sufficiently secure to prevent any user-initiated programming capabilities on the server that may result in modifications to the database. However, it is acceptable for network or system administrators to perform authorized network infrastructure maintenance or application troubleshooting with sufficient access rights. The server shall also be protected from the unauthorized execution of mobile code.

B.2.6 Verification Procedures

There shall be procedures in place for verifying that the critical control program components of the Interactive Gaming System in the production environment are identical to those approved by the regulatory body.

a) Signatures of the critical control program components shall be gathered from the production environment through a process to be approved by the regulatory body, and shall be performed:
   i. Upon installation/updates of components;
   ii. Upon power up or recovery from a shutdown state;
   iii. At least once every 24 hours; and
   iv. On demand.
b) The process shall include one or more analytical steps to compare the current signatures of the critical control program components in the production environment with the signatures of the current approved versions of the critical control program components.
c) The output of the process shall include the current and expected signature results and be stored in an unalterable format, which detail the verification results for each critical control program authentication and:
   i. Be recorded in a system log or report which shall be retained for a period of ninety days or as otherwise specified by the regulatory body;
   ii. Be accessible by the regulatory body in a format which will permit analysis of the verification records by the regulatory body; and
   iii. Comprise part of the system records which shall be recovered in the event of a disaster or equipment or software failure.
d) Any failure of verification of any component of the system shall require a notification of the authentication failure being communicated to the operator and regulatory body as required.
e) There shall be a process in place for responding to authentication failures, including determining the cause of the failure and performing the associated corrections or reinstallations needed in a timely manner.

B.2.7 Electronic Document Retention System

Reports listed under the "Reporting Requirements" within this standard and required by the regulatory body may be stored in an electronic document retention system provided that the system:

a) Is properly configured to maintain the original version along with all subsequent versions reflecting all changes to the report for reports that are stored in an alterable format;

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b) Maintains a unique signature for each version of the report, including the original;
c) Retains and reports a complete log of changes to all reports including who (user identification) performed the changes and when (date and time);
d) Provides a method of complete indexing for easily locating and identifying the report including at least the following (which may be input by the user):
   i. Date and time report was generated;
   ii. Application or system generating the report;
   iii. Title and description of the report;
   iv. User identification of who is generating the report;
   v. Any other information that may be useful in identifying the report and its purpose;
e) Is configured to limit access to modify or add reports to the system through logical security of specific user accounts;
f) Is configured to provide a complete audit trail of all administrative user account activity;
g) Is properly secured through use of logical security measures (user accounts with appropriate access, proper levels of event logging, and document the version control, etc.);
h) Is physically secured with all other critical components of the Interactive Gaming System; and
i) Is equipped to prevent disruption of report availability and loss of data through hardware and software redundancy best practices, and backup processes.

B.2.8 Asset Management

All physical or logical assets housing, processing or communicating sensitive information, including those comprising the operating environment of the Interactive Gaming System and/or its components, shall be accounted for.

a) Procedures shall exist for adding new assets and removing assets from service.
b) Assets shall be disposed of securely and safely using documented procedures.
c) A policy shall be included on the acceptable use of assets associated with the system and its operating environment.
d) The designated "owner" of each asset is responsible for:
   i. Ensuring that information and assets are appropriately classified in terms of their confidentiality, integrity, accountability, and availability; and
   ii. Defining and periodically reviewing access restrictions and classifications.
e) A procedure shall exist to ensure that recorded accountability for assets is compared with actual assets at least annually or at intervals required by the regulatory body and appropriate action is taken with respect to discrepancies.
f) Copy protection to prevent unauthorized duplication or modification of licensed software may be implemented provided that:
   i. The method of copy protection is fully documented and provided to the independent test laboratory, to verify that the protection works as described; or
   ii. The program or component involved in enforcing the copy protection can be individually verified by the methodology approved by the regulatory body.
g) Prior to disposal or re-use, assets containing storage media shall be checked to ensure that any licensed software, as well as PII and other sensitive information has been removed or securely overwritten (i.e., not just deleted).

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B.2.9 Critical Asset Register (CAR)

A Critical Asset Register (CAR) shall be maintained for any assets that affect the functionality of the Interactive Gaming System or has an influence on how PII and other sensitive information is stored/handled by the system. The structure of the CAR shall include hardware and software components and the inter-relationships and dependencies of the components. The following minimum items shall be documented for each asset:

a) The name/definition of each asset;
b) A unique ID that is assigned to each individual asset;
c) A version number of the asset listed;
d) Identifying asset characteristics (e.g., system component, database, virtual machine, hardware);
e) The "owner" responsible for the asset;
f) The geographical location of hardware assets;
g) Relevance codes on the asset's role in achieving or ensuring the following classification criteria:
    i. Confidentiality of PII and other sensitive information (e.g., identification and transaction information);
    ii. Integrity of the system, specifically any asset that affects the functionality of the system and/or has an influence on how PII and other sensitive information is stored and/or handled;
    iii. Availability of PII and other sensitive information; and
    iv. Accountability of user activity, and how much influence the asset has on the user activity.

NOTE: For each of the above classification criteria a relevance code of 1, meaning no relevance (the asset can have no negative impact on the criteria), 2, meaning some relevance (the asset can have an impact on the criteria); or 3, meaning substantial relevance (the criteria are related to or dependent on the asset) shall be assigned.

B.3 Data Integrity

B.3.1 Data Security

The operator shall provide a layered approach to security within the production environment to ensure secure storage and processing of data. The Interactive Gaming System shall provide a logical means for securing PII and other sensitive information, including accounting, reporting, significant event, or other player and gaming data, against alteration, tampering, or unauthorized access.

a) Appropriate data handling methods shall be implemented, including validation of input and rejection of corrupt data.
b) The number of workstations where critical applications or associated databases may be accessed shall be limited.
c) Encryption or password protection or equivalent security shall be used for files and directories containing data. If encryption is not used, the operator shall restrict users from viewing the contents of such files and directories, which at a minimum shall provide for the segregation of system duties and responsibilities as well as the monitoring and recording of access by any person to such files and directories.

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d) The normal operation of any equipment that holds data shall not have any options or mechanisms that may compromise the data.
e) No equipment may have a mechanism whereby an error will cause the data to automatically clear.
f) Any equipment that holds data in its memory shall not allow removal of the information unless it has first transferred that information to the database or other secured component(s) of the system.
g) PII and other sensitive information shall be stored in areas of the server that are encrypted and secured from unauthorized access, both external and internal.
h) Production databases containing data shall reside on networks separated from the servers hosting any player interfaces.
i) Data shall be maintained at all times regardless of whether the server is being supplied with power.
j) Data shall be stored in such a way as to prevent the loss of the data when replacing parts or modules during normal maintenance.

B.3.2 Data Alteration

The alteration of any accounting, reporting or significant event data shall not be permitted without supervised access controls. In the event any data is changed, the following information shall be documented or logged:

a) Unique ID number for the alteration;
b) Data element altered;
c) Data element value prior to alteration;
d) Data element value after alteration;
e) Time and date of alteration; and
f) Personnel that performed alteration (user identification).

B.3.3 Backup Frequency

Backup scheme implementation shall occur at least once every day or as otherwise specified by the regulatory body, although all methods will be reviewed on a case-by-case basis.

B.3.4 Storage Medium Backup

Audit logs, system databases, and any other PII or pertinent gaming data shall be stored using reasonable protection methods. The Interactive Gaming System shall be designed to protect the integrity of this data in the event of a failure. Redundant copies of this data shall be kept on the system with open support for backups and restoration, so that no single failure of any portion of the system would cause the loss or corruption of data.

a) The backup shall be contained on a non-volatile physical medium, or an equivalent architectural implementation, so that should the primary storage medium fail, the functions of the system and the process of auditing those functions can continue with no critical data loss. If hard disk drives are used as backup media, data integrity shall be assured in the event of a disk failure.

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b) Upon completion of the backup process, the backup media is immediately transferred to a location physically separate from the location housing the servers and data being backed up (for temporary and permanent storage).
   i. The storage location shall be secured to prevent unauthorized access and provides adequate protection to prevent the permanent loss of any data.
   ii. Backup data files and data recovery components shall be managed with at least the same level of security and access controls as the system.
c) Where the regulatory body allows for the use of cloud platforms, if the backup is stored in a cloud platform, another copy may be stored in a different cloud platform or region.

B.3.5 System Failure

The Interactive Gaming System shall have sufficient redundancy and modularity so that if any single component or part of a component fails, the functions of the system and the process of auditing those functions can continue with no critical data loss. When two or more components are linked a procedure shall be in place for the Interactive Gaming System and components to be tested after installation but prior to use in a production environment to verify that:

a) The process of all gaming operations between the components shall not be adversely affected by restart or recovery of either component (e.g., transactions are not to be lost or duplicated because of recovery of one component or the other); and
b) Upon restart or recovery, the components shall immediately synchronize the status of all transactions, data, and configurations with one another.

B.3.6 Accounting of Master Resets

The operator shall be able to identify and properly handle the situation where a master reset has occurred on any component which affects gaming operations.

B.3.7 Recovery Requirements

In the event of a catastrophic failure when the Interactive Gaming System cannot be restarted in any other way, it shall be possible to restore the system from the last backup point and fully recover. The contents of that backup shall contain the following critical information including, but not limited to:

a) The recorded information specified under the section entitled “Information to be Maintained”;
b) Specific site or venue information such as configuration, security accounts, etc.;
c) Current system encryption keys; and
d) Any other system parameters, modifications, reconfiguration (including participating sites or venues), additions, merges, deletions, adjustments and parameter changes.

B.3.8 Uninterruptible Power Supply (UPS) Support

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All system components shall be provided with adequate primary power. Where the server is a stand-alone application, it shall have an Uninterruptible Power Supply (UPS) connected and shall have sufficient capacity to permit a graceful shut-down and that retains all PII and other sensitive information during a power loss. It is acceptable that the system may be a component of a network that is supported by a network-wide UPS provided that the server is included as a device protected by the UPS. There shall be a surge protection system in use if not incorporated into the UPS itself.

B.3.9 Business Continuity and Disaster Recovery Plan

A business continuity and disaster recovery plan shall be in place to recover gaming operations if the Interactive Gaming System's production environment is rendered inoperable. Such plan shall consider disasters including, but not limited to, those caused by weather, water, flood, fire, environmental spills and accidents, malicious destruction, acts of terrorism or war, and contingencies such as strikes, epidemics, pandemics, etc. The business continuity and disaster recovery plan shall:

a) Address the method of storing PII and other sensitive information, including gaming data, to minimize loss. If asynchronous replication is used, the method for recovering information shall be described or the potential loss of information shall be documented;
b) Delineate the circumstances under which it will be invoked;
c) Address the establishment of a recovery site physically separated from the production site. Utilization of cloud platforms for this purpose will be evaluated on a case-by-case basis;
d) Contain recovery guides detailing the technical steps required to re-establish gaming functionality at the recovery site; and
e) Address the processes required to resume administrative operations of gaming activities after the activation of the recovered system for a range of scenarios appropriate for the operational context of the system.

NOTE: The distance between the two locations should be determined based on potential environmental threats and hazards, power failures, and other disruptions but should also consider the potential difficulty of data replication as well as being able to access the recovery site within a reasonable time (Recovery Time Objective).

B.4 Communications

B.4.1 General Statement

This section will discuss the various wired and wireless communication methods, including communications performed across the internet or a public or third-party network, as allowed by the regulatory body.

B.4.2 Connectivity

Only authorized devices shall be permitted to establish communications between any critical components of the system. The Interactive Gaming System shall provide a method to:

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a) Enroll and un-enroll critical components;
b) Enable and disable specific critical components;
c) Ensure that only enrolled and enabled critical components can participate in gaming operations; and
d) Ensure that the default condition for critical components shall be un-enrolled and disabled.

B.4.3 Communication Protocol

Each component of the Interactive Gaming System shall function as indicated by a documented secure communication protocol.

a) All protocols shall use communication techniques that have proper error detection and recovery mechanisms, which are designed to prevent intrusion, interference, eavesdropping and tampering. Any alternative implementations will be reviewed on a case-by-case basis and approved by the regulatory body.
b) All data communications critical to gaming or player account management shall employ encryption and authentication.
c) Communications on the secure network shall only be possible between approved critical components that have been enrolled and authenticated as valid on the network. No unauthorized communications to components and/or access points shall be allowed.
d) Communications shall be hardened in order to be immune to all possible malformed message attacks.
e) After a system interruption or shutdown, communication with all components necessary for system operation shall not be established and authenticated until the program resumption routine, including any self-tests, are completed successfully.

B.4.4 Communications Over Internet/Public Networks

Communications between any system components, including Remote Player Devices, which takes place over internet/public networks, shall be secure by encrypting the data packets or by utilizing a secure communications protocol to ensure the integrity and confidentiality of the transmission. PII, sensitive information, wagers, results, financial information, and player transaction information shall always be encrypted over the internet/public network and protected from incomplete transmissions, misrouting, unauthorized message modification, disclosure, duplication or replay.

B.4.5 Wireless Local Area Network (WLAN) Communications

Wireless Local Area Network (WLAN) communications, as allowed by the regulatory body, shall adhere to the applicable jurisdictional requirements specified for wireless devices and network security. In the absence of specific jurisdictional standards, the "Wireless Device Requirements" and "Wireless Network Security Requirements" of the *GLI-26 Standards for Wireless Systems* shall be used as applicable.

NOTE: It is imperative for operators to review and update internal control policies and procedures to ensure the network is secure and threats and vulnerabilities are addressed accordingly. Periodic inspection and verification of the integrity of the WLAN is recommended.

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B.4.6 Network Security Management

Networks shall be logically separated such that there should be no network traffic on a network link which cannot be serviced by hosts on that link. The following requirements apply:

a) All network management functions shall authenticate all users on the network and encrypt all network management communications.
b) The failure of any single item shall not result in a denial of service.
c) An Intrusion Detection System/Intrusion Prevention System (IDS/IPS) shall be installed which includes one or more components that can listen to both internal and external communications as well as detect or prevent:
    i. Distributed Denial of Service (DDOS) attacks;
    ii. Shellcode from traversing the network;
    iii. Address Resolution Protocol (ARP) spoofing; and
    iv. Other "Man-In-The-Middle" attack indicators and sever communications immediately if detected.
d) In addition to the requirements in (c), an IDS/IPS installed on a WLAN shall be able to:
    i. Scan the network for any unauthorized or rogue access points or devices connected to any access point on the network at least quarterly or if defined by the regulatory body;
    ii. Automatically disable any unauthorized or rogue devices connected to the system; and
    iii. Maintain a history log of all wireless access for at least the previous ninety days or as otherwise specified by the regulatory body. This log shall contain complete and comprehensive information about all wireless devices involved and shall be able to be reconciled with all other networking devices within the site or venue.
e) Network Communication Equipment (NCE) shall meet the following requirements:
    i. NCE shall be constructed in such a way as to be resistant to physical damage to the hardware or corruption of the contained firmware/software by normal usage;
    ii. NCE shall be physically secured from unauthorized access;
    iii. System communications via NCE shall be logically secured from unauthorized access; and
    iv. NCE with limited onboard storage shall, if the audit log becomes full, disable all communication or offload logs to a dedicated log server.
f) All entry and exit points to the network shall be identified, managed, controlled, and monitored on a 24/7 basis. In addition:
    i. All network hubs, services and connection ports shall be secured to prevent unauthorized access to the network; and
    ii. Unused services and non-essential ports shall be either physically blocked or software disabled whenever possible.
g) In cloud and virtualized environments, redundant server instances shall not run under the same hypervisor. In addition:
    i. Each server instance may perform only one function; and
    ii. Alternative equivalently secure mechanisms will be considered as technology advances.
h) Stateless protocols, such as UDP (User Datagram Protocol), shall not be used for sensitive information without stateful transport. Note that although HTTP (Hypertext Transport Protocol) is technically stateless, if it runs on TCP (Transmission Control Protocol) which is stateful, this is allowed.

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i) All changes to network infrastructure (e.g., network communication equipment configuration) shall be logged.
j) Virus scanners and/or detection programs shall be installed on the system. These programs shall be updated regularly to scan for new strains of viruses.
k) The operator shall monitor the system and network in order to prevent, detect, mitigate, and respond to cyberattacks.

B.4.7 Active and Passive Attacks

Appropriate measures shall be in place to detect, prevent, mitigate, and respond to common active and passive technical attacks. The operator shall have an established procedure to gather cyber threat intelligence and act on it appropriately.

B.4.8 Mobile Computing and Communications

A formal policy shall be in place, and appropriate security measures shall be adopted to protect against the risks of using mobile computing and communication facilities. Telecommuting shall not be permitted except under circumstances where the security of the endpoint can be guaranteed.

B.5 Third-Party Service Providers

B.5.1 Third-Party Communications

Where communications with third-party service providers are implemented, such as for player loyalty programs, payment services (financial institutions, payment processors, etc.), location services, information security services, cloud services, live game services, and identity verification services, the following requirements apply:

a) The Interactive Gaming System shall be capable of securely communicating with third-party service providers using encryption and strong authentication.
b) All login events involving third-party service providers shall be recorded to an audit file.
c) Communication with third-party service providers shall not interfere or degrade normal Interactive Gaming System functions.
    i. Third-party service provider data shall not affect player communications.
    ii. Third-party service providers shall be on a segmented network separate from network segments hosting player connections.
    iii. Gaming shall be disabled on all network connections except for those within the production environment.
    iv. The system shall not route data packets from third-party service providers directly to the production environment and vice-versa.
    v. The system shall not act as IP routers between the production environment and third-party service providers.

B.5.2 Third-Party Services

The security roles and responsibilities of third-party service providers shall be defined and

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documented as required by the regulatory body. The operator shall have policies and procedures for managing them and monitoring their adherence to relevant security requirements.

a) Agreements with third-party service providers involving accessing, processing, communicating or managing the system and/or its components, or adding products or services to the system and/or its components shall cover all relevant security requirements.
b) The services, reports and records provided by the third-party service providers shall be monitored and reviewed annually or as required by the regulatory body.
c) Changes to the provision of third-party service providers, including maintaining and improving existing security policies, procedures and controls, shall be managed, taking account of the criticality of systems and processes involved and re-assessment of risks.
d) The access rights of third-party service providers to the system and/or its components shall be removed upon termination of their contract or agreement or adjusted upon change.

B.5.3 Third-Party Data Processing

Unauthorized third-party service providers shall be prevented from viewing or altering PII and other sensitive information. Where PII and other sensitive information is shared with third-party service providers, formal data processing agreements shall be in place that states the rights and obligations of each party concerning the protection of the PII and other sensitive information. Each data processing agreement shall set out:

a) The subject matter and duration of the processing;
b) The nature and purpose of the processing;
c) The type of data to be processed;
d) How the data is stored;
e) The detail of the security surrounding the data;
f) The means used to transfer the data from one organization to another;
g) The means used to retrieve data about certain individuals;
h) The method for ensuring a retention schedule is adhered to;
i) The means used to delete or dispose of the data; and
j) The categories of data.

B.6 Technical Controls

B.6.1 Domain Name Service (DNS) Requirements

The following requirements apply to the servers used to resolve public or external Domain Name Service (DNS) queries used in association with the Interactive Gaming System.

a) The operator shall utilize a secure primary DNS server and a secure secondary DNS server which are logically and physically separate from one another.
b) The primary DNS server shall be physically located in a secure data center or a virtualized host in an appropriately secured hypervisor or equivalent.
c) Logical and physical access to the DNS server(s) shall be restricted to authorized personnel.
d) Zone transfers to arbitrary hosts shall be disallowed.

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e) A method to prevent cache poisoning, such as DNS Security Extensions (DNSSEC), is required.
f) Multi-factor authentication shall be in place.
g) Registry lock shall be in place, so any request to change DNS server(s) will need to be verified manually.

B.6.2 Cryptographic Controls

A policy on the use of cryptographic controls for protection of information shall be developed and implemented.

a) PII and other sensitive information shall be encrypted if it traverses a network with a lower level of trust. Encryption shall also be applied for such PII and other sensitive information stored on portable computer systems (e.g., laptops, USB devices, etc.).
b) Data that is not required to be hidden but shall be authenticated shall use some form of message authentication technique.
c) Authentication shall use a security certificate from an approved organization, containing information about whom it belongs to, who it was issued by, valid dates, a unique serial number or other unique identification that can be used to verify the contents of the certificate.
d) The grade of encryption used shall be appropriate to the sensitivity of the data.
e) The use of encryption algorithms shall be reviewed periodically to verify that the current encryption algorithms are secure.
f) The encryption method shall include the use of different encryption keys so that encryption algorithms can be changed or replaced to correct weaknesses as soon as practical. Other methodologies shall be reviewed on a case-by-case basis.
g) Encryption keys shall be stored on a secure and redundant storage medium after being encrypted themselves through a different encryption method and/or by using a different encryption key.

B.6.3 Encryption Key Management

The management of encryption keys shall follow defined processes established by the operator and/or regulatory body, which shall cover the following:

a) Obtaining or generating encryption keys and securely storing them in a way which limits access;
b) Managing the expiry of encryption keys, where applicable;
c) Revoking encryption keys;
d) Securely changing the current encryption keyset; and
e) Recovering data encrypted with a revoked or expired encryption key for a defined period after the encryption key becomes invalid.

B.6.4 Critical Component Hardening

Configuration procedures for critical components shall address all known security vulnerabilities and be consistent with industry-accepted best practices for system hardening. The appropriateness and effectiveness of steps taken to harden critical components shall be regularly assessed and, if

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appropriate, changes shall be made to improve the hardening. These configuration procedures shall include the following:

a) All default or standard configuration parameters shall be removed from all components where a security risk is presented;
b) Only one primary function shall be implemented per server to prevent functions that require different security levels from co-existing on the same server;
c) Additional security features shall be implemented for any required services, protocols or daemons that are considered to be insecure;
d) System security parameters shall be configured to prevent misuse; and
e) All unnecessary functionality shall be removed, such as scripts, drivers, features, subsystems, file systems, and unnecessary web servers.

B.6.5 Generation and Storage of Logs

There shall be procedures in place to centrally monitor and manage user activities, exceptions, and information security events. Logs recording these items shall be:

a) Generated on each critical component of the system in order to monitor and rectify anomalies, flaws and alerts;
b) Stored for an appropriate period to assist in future investigations and access control monitoring;
c) Protected against tampering and unauthorized access; and
d) Reviewed periodically using a documented process. A record of each review shall be maintained.

B.7 Remote Access and Firewalls

B.7.1 Remote Access Security

Remote access is defined as any access from outside the system or system network including any access from other networks within the same site or venue. Remote access shall only be allowed if authorized by the regulatory body and shall:

a) Be performed via a secured method, such as a multi-factor authentication process;
b) Have the option to be disabled;
c) Accept only the remote connections permissible by the firewall application and system settings;
d) Be limited to only the application functions necessary for users to perform their job duties:
   i. No unauthorized remote user administration functionality (adding users, changing permissions, etc.) is permitted; and
   ii. Unauthorized access to the operating system or to any database other than information retrieval using existing functions is prohibited.

NOTE: Remote access security will be reviewed on a case-by-case basis, in conjunction with the implementation of the current technology and approval from the regulatory body.

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B.7.2 Remote Access Procedures by Suppliers

A procedure for strictly controlled remote access shall be established. It is acknowledged that the supplier may, as needed, access the system and its associated components remotely for product and user support or updates/upgrades, as permitted by the regulatory body and the operator. This remote access shall use user accounts reserved for this purpose which are:

a) Continuously monitored by the operator;
b) Disabled when not in use; and
c) Restricted through logical security controls to access only the necessary application(s) and/or database(s) for the product and user support or providing updates/upgrades.

B.7.3 Remote Access Activity Log

The remote access application shall maintain an activity log which updates automatically depicting all remote access information, to include:

a) Identification of user(s) who performed and/or authorized the remote access;
b) Remote IP Addresses, Port Numbers, Protocols, and where possible, MAC Addresses;
c) Time and date the connection was made and duration of connection; and
d) Activity while logged in, including the specific areas accessed and changes made.

NOTE: This activity log shall be regularly reviewed as required by the operator and/or the regulatory body.

B.7.4 Firewalls

All communications, including remote access, shall pass through at least one approved application-level firewall. This includes connections to and from any non-system hosts used by the operator.

a) The firewall shall be located at the boundary of any two dissimilar security domains.
b) A device in the same broadcast domain as the system host shall not have a facility that allows an alternate network path to be established that bypasses the firewall.
c) Any alternate network path existing for redundancy purposes shall also pass through at least one application-level firewall.
d) Only firewall-related applications may reside on the firewall.
e) Only a limited number of user accounts may be present on the firewall (e.g., network or system administrators only).
f) The firewall shall reject all connections except those that have been specifically approved.
g) The firewall shall reject all connections from destinations which cannot reside on the network from which the message originated (e.g., RFC1918 addresses on the public side of an internet firewall).
h) The firewall shall only allow remote access using encryption that meets current industry accepted standards**,** such as ISO/IEC 19790, FIPS 140-2, or equivalent**.**

B.7.5 Firewall Audit Logs

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Firewalls used to protect the production environment shall be able to log audit information in a manner to preserve and secure the information from loss or alteration. This information includes the following:

a) All changes to configuration of the firewall;
b) All successful and unsuccessful connection attempts through the firewall; and
c) The source and destination IP Addresses, Port Numbers, Protocols, and where possible, MAC Addresses.

NOTE: A configurable parameter 'unsuccessful connection attempts' may be utilized to deny further connection requests should the predefined threshold be exceeded. The system administrator shall also be notified.

B.8 Change Management

B.8.1 General Statement

A change management policy (CMP) is selected by the regulatory body for handling updates to the Interactive Gaming System and its components based on the propensity for frequent system upgrades and chosen risk tolerance. For systems that require frequent updates, a risk-based change management program may be utilized to afford greater efficiency in deploying updates. Risk-based CMPs typically include a categorization of proposed changes based on regulatory impact and define associated certification procedures for each category. The independent test laboratory will evaluate the system and future modifications in accordance with the CMP selected by the regulatory body.

B.8.2 Program Change Control Procedures

Program change control procedures shall be adequate to ensure that only authorized versions of programs are implemented on the production environment. These change controls shall include:

a) An appropriate software version control or mechanism for all software components, source code, and binary controls;
b) Records kept of all new installations and/or modifications to the system, including:
    i. The date of the installation or modification;
    ii. Details of the reason or nature of the installation or change such as new software, server repair, significant configuration modifications;
    iii. The component(s) to be changed including the unique identification number from the CAR, version information, and if the component being changed is hardware, the physical location of this component;
    iv. The identity of the user(s) performing the installation or modification;
    v. The identity of the user(s) responsible for authorizing the installation or modification;
c) A strategy to cover the potential for an unsuccessful install or a field issue with one or more changes implemented under the CMP:
    i. Where an outside party such as an App store is a stakeholder in the release process, this strategy shall cover managing releases through the outside party. This strategy may take into account the severity of the issue;

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ii. Otherwise, this strategy shall cover reverting back to the last implementation (rollback plan), including complete backups of previous versions of software and a test of the rollback plan prior to implementation to the production environment;

d) A policy addressing emergency change procedures;
e) Procedures for testing and migration of changes, including the identification of authorized personnel for signoff prior to release;
f) Segregation of duties within the release process; and
g) Procedures to ensure that technical and user documentation is updated as a result of a change.

B.8.3 System Development Life Cycle

The acquisition and development of new software shall follow defined processes established by the operator and/or regulatory body.

a) The production environment shall be logically and physically separated from the development and test environments. When cloud platforms are used, no direct connection may exist between the production environment and any other environment.
b) The delegation of responsibilities between the operator and/or supplier shall be established where applicable.
c) There shall be a documented method to develop software securely:
   i. Following industry standards and/or best practices for coding; and
   ii. Incorporating information security throughout the life cycle.
d) The documented test methodology shall include provisions to:
   i. Verify that test software is not deployed to the production environment; and
   ii. Prevent the use in testing of actual PII and other sensitive information, or other raw production data.
e) All documentation relating to software and application development shall be available and retained for the duration of its life cycle.

B.8.4 Patches

The operator shall have patching policies agreed upon with the regulatory body, whether developed and supported by the operator or by a third-party service provider. All patches should be tested whenever possible on a development and test environment configured identically to the target production environment. Under circumstances where patch testing cannot be thoroughly conducted in time to meet the timelines for the severity level of the alert and if authorized by the regulatory body, then patch testing should be risk managed, either by isolating or removing the untested component from the network or applying the patch and testing after the fact.

B.9 Technical Security Testing

B.9.1 Periodic Security Testing

On an annual basis, or as required by the regulatory body, technical security tests on the production environment shall be performed to guarantee that no vulnerabilities putting at risk the security and operation of the Interactive Gaming System exist.

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a) These tests shall consist of a method of evaluation of security by means of an attack simulation by a third-party following a known methodology, and the analysis of vulnerabilities will consist in the identification and passive quantification of the potential risks of the system.
b) Unauthorized access attempts shall be carried out up to the highest level of access possible and shall be completed with and without available authentication credentials (white box/black box type testing). These allow assessments to be made regarding operating systems and hardware configurations, including but not limited to:
    i. UDP/TCP port scanning;
    ii. Stack fingerprinting and TCP sequence prediction to identify operating systems and services;
    iii. Public Service Banner grabbing;
    iv. Web scanning using HTTP and HTTPS vulnerability scanners; and
    v. Scanning routers using BGP (Border Gateway Protocol), BGMP (Border Gateway Multicast Protocol) and SNMP (Simple Network Management Protocol).
c) Once completed, a report on the assessments shall be provided to the operator and/or regulatory body, which shall include:
    i. Scope of review;
    ii. Name and company affiliation of the individual(s) who conducted the assessment;
    iii. Date of the assessment;
    iv. Findings;
    v. Recommended corrective action, if applicable; and
    vi. The operator's response to the findings and recommended corrective action.

B.9.2 Vulnerability Assessment

The purpose of the vulnerability assessment is to identify vulnerabilities, which could be later exploited during penetration testing by making basic queries relating to services running on the systems concerned. The vulnerability assessment shall include at least the following activities:

a) External Vulnerability Assessment – The targets are the network devices and servers which are accessible by a third-party (both a person and a company), by means of a public IP (publicly exposed), related to the system from which is possible to access PII and other sensitive information.
b) Internal Vulnerability Assessment – The targets are the internal facing servers (within the DMZ, or within the LAN if there is no DMZ) related to the system from which is possible to access PII and other sensitive information. Testing of each security domain on the internal network shall be undertaken separately.

B.9.3 Penetration Testing

The purpose of the penetration testing is to exploit any weaknesses uncovered during the vulnerability assessment on any publicly exposed applications or systems hosting applications processing, transmitting and/or storing PII and other sensitive information. The penetration testing shall include at least the following activities:

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a) Network Layer Penetration Test – The test mimics the actions of an actual attacker exploiting weaknesses in the network security examining systems for any weakness that could be used by an external attacker to disrupt the confidentiality, availability and/or integrity of the network.
b) Application Layer Penetration Test – The test uses tools to identify weaknesses in the applications with both authenticated and unauthenticated scans, analysis of the results to remove false positives, and manual testing to confirm the results from the tools and to identify the impact of the weaknesses.

B.9.4 Firewall Rules Review

If required by the regulatory body, the firewall rules shall be periodically reviewed to verify the operating condition of the firewall and the effectiveness of its security configuration and rule sets and shall be performed on all the perimeter firewalls and the internal firewalls.

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Appendix C: Operational Audit for Service Providers

C.1 Introduction

C.1.1 General Statement

This appendix sets forth procedures and practices for the assessment of providers of particular services, which will be reviewed in an operational audit as a part of the Interactive Gaming System evaluation, including, but not limited to evaluation of information security services, cloud services, payment services (financial institutions, payment processors, etc.), location services, live game services, and any other services which may be offered directly by the operator or involve the use of third-party service providers.

NOTE: It is also recognized that additional procedures and practices which are not specifically included within this standard will be relevant and required for an operational audit as determined by the operator and/or regulatory body within their rules, regulations, and Minimum Internal Control Standards (MICS).

C.2 Information Security Services

C.2.1 Information Security Management System (ISMS) Audit

The operator or a third-party information security service provider used to provide management, support, security, or disaster recovery services for the system shall undergo a specific audit as required by the regulatory body. Their Information Security Management System (ISMS) will be reviewed against common information security principles in relation to confidentiality, integrity and availability, as covered within the appendix for "Operational Audit for Technical Security Controls", and this section. If allowed by the regulatory body for completing this audit, it is acceptable to leverage the results of prior audits conducted by appropriately accredited vendors and qualified individuals, within the current audit period (e.g., within the past year), against standards such as ISO/IEC 27001, the NIST Cybersecurity Framework (CSF), or equivalent. Such leveraging will be noted in the audit report.

C.2.2 Information Security Policy

An information security policy shall be in effect to describe the ISMS's approach to managing information security and its implementation. The information security policy shall:

a) Have a provision requiring review at planned intervals and when changes occur to the Interactive Gaming System or the operator's processes which alter the risk profile of the system;
b) Be approved by management and communicated to all operator employees and relevant third-party service provider employees; and
c) Delineate the security roles and responsibilities of operator employees and relevant third-party service provider employees for the operation, service and maintenance of the Interactive Gaming System and/or its components;

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C.2.3 Access Control Policy

An access control policy shall be established and documented within the ISMS which shall be periodically reviewed based on business and security requirements for physical and logical access to the Interactive Gaming System and/or its components.

a) A formal user registration and de-registration procedure shall be in place for granting and revoking access to the Interactive Gaming System and/or its components.
b) The allocation of access privileges shall be restricted and controlled based on business requirements and the principle of least privilege.
c) Employees shall only be provided with access to the services or facilities that they have been specifically authorized to use.
d) Employees shall receive appropriate security awareness training and regular updates in organizational policies and procedures as needed for their job function.
e) Management shall review user access rights at regular intervals using a formal process.
f) The access rights of employees to the Interactive Gaming System and/or its components shall be removed upon termination of their employment, contract or agreement, or adjusted upon change.

C.2.4 Allocation of Security Responsibilities

Security responsibilities shall be effectively documented and implemented within the ISMS.

a) A security forum comprised of management shall be formally established to monitor and review the ISMS to ensure its continuing suitability, adequacy and effectiveness, maintain formal minutes of meetings, and convene periodically as required by the regulatory body.
b) A security department shall exist that will be responsible to develop and implement security strategies and action plans. The security department shall:
    i. Be involved in and review all processes regarding security aspects of the operator, including, but not be limited to, the protection of information, communications, physical infrastructure, and game processes;
    ii. Report to no lower than executive level management and not reside within or report to the IT department; and
    iii. Have the competences and be sufficiently empowered and have access to all necessary resources to enable the adequate assessment, management, and reduction of risk.
c) The head of the security department shall be a member of the security forum and be responsible for recommending security policies and changes.

C.2.5 Incident Management

A process for reporting information security incidents and the management response shall be documented and implemented within the ISMS in accordance with the information security policy. The incident management process shall:

a) Include a definition of what constitutes an information security incident;

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b) Document how information security incidents are reported through appropriate management channels;
c) Address management responsibilities and procedures to ensure a rapid, effective and orderly response to information security incidents, including:
   i. Procedures to handle different types of information security incident;
   ii. Procedures for the analysis and identification of the cause of the incident;
   iii. Communication with those affected by the incident;
   iv. Reporting of the incident to the appropriate authority;
   v. Forensic evidence collection; and
   vi. Controlled recovery from information security incidents.

C.3 Cloud Services

C.3.1 Cloud Service Provider Audit

An operator making use of a cloud service provider, as allowed by the regulatory body, to store, transmit or process PII and other sensitive information shall undergo a specific audit as required by the regulatory body. The cloud service provider's operations will be reviewed against common information security principles in relation to the provision and use of cloud services, as covered within the appendix for "Operational Audit for Technical Security Controls", and this section. If allowed by the regulatory body for completing this audit, it is acceptable to leverage the results of prior audits conducted by appropriately accredited vendors and qualified individuals, within the current audit period (e.g., within the past year), against standards such as ISO/IEC 27017 and ISO/IEC 27018 or equivalent. Such leveraging will be noted in the audit report.

C.3.2 Cloud Service Provider Relationship

Cloud security is a shared responsibility between the cloud service provider and the operator.

a) If PII and other sensitive information is stored, processed or transmitted in a cloud environment, the applicable requirements will apply to that environment, and will typically involve validation of both the cloud service provider's infrastructure and the operator's usage of that environment.
b) The allocation of responsibility between the cloud service provider and the operator for managing security controls does not exempt an operator from the responsibly of ensuring that PII and other sensitive information is properly secured according to the applicable requirements.
c) Clear policies and procedures shall be agreed between the cloud service provider and the operator for all security requirements, and responsibilities for operation, management and reporting shall be clearly defined and understood for each applicable requirement.

C.4 Payment Services

C.4.1 Payment Service Provider Audit

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The operator or a third-party payment service provider used to conduct transactions with financial institutions shall undergo a specific audit as required by the regulatory body. The payment service provider's operations will be reviewed against common information security principles in relation to the provision and use of payment services, as covered within the appendix for "Operational Audit for Technical Security Controls", and this section. If allowed by the regulatory body for completing this audit, it is acceptable to leverage the results of prior audits conducted by appropriately accredited vendors and qualified individuals, within the current audit period (e.g., within the past year), against standards such as the Payment Card Industry Data Security Standards (PCI-DSS) or equivalent. Such leveraging will be noted in the audit report.

C.4.2 Securing Payments

The payment service provider shall protect payment types used in the system from fraudulent use.

a) Collection of PII and other sensitive information directly related to financial transactions shall be limited to only the information strictly needed for the transaction.
b) There shall be processes in place for verifying the payment service provider's protection of the PII or other sensitive information directly related to each financial transaction.
c) Any communication channels between the operator and the payment service provider conveying payment details shall be encrypted and protected against interception.
d) All financial transactions shall be reconciled between the operator and the payment service provider daily or as otherwise specified by the regulatory body. There shall be established procedures for:
    i. In calculating amounts paid to or received from a player, considering all payments used by the player or operator; and
    ii. Assuring the match of ownership between the payment type holder and the player account holder.

C.5 Location Services

C.5.1 Location Service Provider Audit

The operator or a third-party location service provider used to provide information for the identification of and the geographic location of players as authorized by the regulatory body shall undergo a specific audit as required by the regulatory body to assess and measure its continued ability to detect and mitigate existing and emerging location fraud risks, including the controls within this section.

C.5.2 Location Service Reporting and Analytics

Given that location fraud shall be assessed on a single location check, as well as cumulative player locations over time, the location service provider shall:

a) Have procedures to maintain a real-time data feed of all location checks and an up-to-date list of potential location fraud risks (e.g., fake location apps, virtual machines, remote desktop programs, etc.);

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b) Offer an alert system to identify unauthorized or improper access; and
c) Facilitate routine, recurrent delivery of supplemental fraud reports pertaining to suspicious or unusual activities, account sharing, malicious players and devices, as well as other high-risk transactional data.

C.5.3 Location Service Maintenance

To maintain the overall integrity of the location service, the location service provider shall ensure the location detection service or application used for location detection:

a) Utilizes closed-source databases (IP, proxy, VPN, etc.) that are frequently updated and periodically tested for accuracy and reliability; and
b) Undergoes frequent updates to maintain cutting-edge data collection, device compatibility, and fraud prevention capabilities against location fraud risks.

C.6 Live Game Services

C.6.1 Live Game Service Provider Audit

The live game service provider shall be required to meet the applicable aspects of the appropriate policy and/or procedure documents as determined by the operator in consultation with the regulatory body, including the controls within this section. To maintain the integrity of the game outcome determination process, live game services may be subject to an additional verification audit, as required by the regulatory body.

C.6.2 Live Game Environment Security

The live game environment shall be defined and have appropriate physical security controls. Secure areas, consumables, and live game equipment shall be protected by appropriate entry controls and security procedures to ensure that only authorized members of staff are allowed access according to the following guidelines:

a) In case the live games occur in a gaming venue (e.g., casino, bingo hall, card room, etc.), where the gaming area is opened for game play by in-person players, according to the laws and standards of the regulatory body, the live game environment shall be controlled with the same rules and controls as the gaming venue, including, but not necessarily restricted to:
    i. The security systems of the perimeters of those areas where the live games occur; and
    ii. The controls on the accesses to those areas, to ensure that only authorized members of staff could reach them, and controls on the whole area near to the live game equipment to ensure the players correctness.
b) In the case the live games occur in a gaming venue, during the public opening hours, in a gaming area not opened for game play by in-person players:
    i. The areas where the live games occur and the whole of the area near the live game equipment and the related accesses, shall be at least protected by delimitation and alert barriers and supervised by the security staff; and
    ii. The live game equipment shall be subject to access controls as though these were in a

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gaming venue.

c) In the case the live games occur in a private gaming studio or in a gaming venue during public closure hours or in a gaming area not opened to game play for the in-person players and not supervised by the security staff:
   i. The areas where the live games occur and the whole of the area near the live game equipment and the related accesses, shall be protected by physical barriers and the related accesses protected through access security systems; and
   ii. Access points such as delivery and loading areas and other points where unauthorized persons may enter the areas where the live games occur shall be controlled and, if possible, isolated from operations areas to avoid unauthorized access.

C.6.3 Surveillance and Recording

The live game service provider will be required to install, maintain, and operate a surveillance system that has the capability to monitor and record continuous unobstructed views of all live game play.

a) A continuous recording shall be made of all the games played so that:
   i. The information necessary to adequately reconstruct each game, consistent with the applicable recall requirements stated within the section entitled "Last Play Information Required" which are not displayed by the Gaming Platform itself, is identifiable and distinguishable;
   ii. The date and time of each game can be determined to an accuracy of one second relative to the clock used by the system; and
   iii. The sequence of games relative to each other can be determined.
b) Procedures shall be in place to ensure that the recording:
   i. Covers the defined live game environment with sufficient detail to confirm whether the game rules and procedures were followed and to identify discrepancies;
   ii. Is captured in such a way that precludes interference or deletion;
   iii. Can be reviewed by the operator and/or regulatory body in the event of a player complaint/dispute; and
   iv. Is kept for at least ninety days or as required by the regulatory body.

C.6.4 Simulcast Control Servers

The live game service provider shall utilize simulcast control servers for recording all gaming activity and results. The live game service provider may use their own surveillance camera and split live feed to simulcast control server, or there may be a separate network of video involved. The simulcast control servers shall:

a) Provide the player with real-time audio/visual access to the live game being played, including:
   i. Any information found in the sections entitled "Game Information and Rules of Play" and "Information to be Displayed" which are not displayed by the Gaming Platform itself;
   ii. The actions of the gaming attendant and, where applicable, other players;
   iii. Date and time at the gaming venue; and
   iv. Game identification/table number and location.

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b) Provide each player with an equivalent quality video/audio feed.
   i. This equivalence shall be measured and verified whenever communications are initiated, including reconnection due to signal interruptions or re-initiation when the signal was severed.
   ii. A minimum signal connection requirement shall be established, enforced and disclosed to the player.
c) Prevent anyone from accessing the live game outcome prior to finalizing a wager.
d) Record game results before posting to the Gaming Platform.
e) Be equipped with a mechanism for an authorized employee to void game results, if necessary.

C.6.5 Live Game Equipment

The live game service provider shall provide a secure location for the placement, operation, and usage of live game equipment, including simulcast control servers, gaming servers and communications equipment. Security policies and procedures shall be in place and reviewed periodically to ensure that risks are identified, mitigated and underwritten by contingency plans. In addition, live game equipment shall meet minimum standards as determined by the regulatory body as well as the following requirements:

a) Live game equipment shall be installed according to a defined plan and records of all installed live game equipment shall be maintained.
b) Live game equipment shall be sited or protected to reduce the risks from:
   i. Environmental threats and hazards;
   ii. Opportunities for unauthorized access;
   iii. Power failures; and
   iv. Other disruptions caused by failures in supporting utilities.
c) Access to the live game equipment by the gaming attendant shall be controlled by a secure logon procedure or other secure process approved by the regulatory body to ensure that only authorized gaming attendants are allowed access. It shall not be possible to modify the configuration settings of the live game equipment without an authorized secure process.
d) A user session, where supported by live game equipment, is initiated by the gaming attendant logging in to their user account using their secure username and password or an alternative means for the gaming attendant to provide identification information as allowed by the regulatory body.
   i. All available options presented to the gaming attendant shall be tied to their user account.
   ii. If the live game equipment does not receive input from the gaming attendant within five minutes, or a period specified by the regulatory body, the user session shall time out or lock up, requiring the gaming attendant to re-establish their login in order to continue.
e) To ensure its continued availability and integrity, live game equipment shall be correctly maintained, inspected and serviced at regular intervals by designated staff to ensure that it is free from defects or mechanisms that could interfere with its operation.
f) Prior to disposal or re-use, live game equipment containing storage media shall be checked to ensure that any licensed software and other sensitive information has been removed or securely overwritten (i.e., not just deleted).

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C.6.6 Live Game Consumables

Consumables used by live game services shall meet minimum standards as determined by the regulatory body as well as the following requirements:

a) Procedures shall be implemented for tracking the inventory of consumables from receipt, through storage, installation, use, retirement, and destruction. All consumables shall have an associated audit trail which shows which designated staff had access to the consumables at any given time for any given operation;
b) Periodic random inspections shall be performed on the consumables in use, from disbursement to retirement; and
c) Used consumables shall be destroyed in a manner which prevents their accidental re-use in live games, and which puts them permanently beyond use.

C.6.7 Physical Player Chips

The following controls apply to physical player chips used in live games. For instance, in a live poker game involving both in-person players and players who are playing through a Gaming Platform, physical player chips may be placed on the table to indicate the player's wager to the other players.

a) All chips shall have identical physical characteristics except for specific differences in denomination.
b) The chips of all possible denominations shall be shown (as per the game denomination) so that unavailability of chips of smaller denominations will not force players to bet more.
c) Each chip shall be designed so that the specific denomination of each chip can be determined when placed in a stack of chips of various denominations.
d) The chips used shall be unique for each denomination they are representing, and the denomination shall be clearly visible on any chip.

C.6.8 Live Game Procedures

The following procedures shall be in place for live game service providers. These procedures shall be reviewed periodically to ensure that risks are identified, mitigated and underwritten by contingency plans.

a) Procedures shall be in place to enable a suitable response to any security issue within the live game services.
b) Procedures shall be in place to prevent any person from tampering with or interfering with the operation of any live game or live game equipment.
c) Separate procedures shall exist for each game and new games shall have their procedures in place before being offered to players.
d) The following procedures shall be in place for the staff of the live game service provider, including game attendants, as required by the regulatory body:
    i. Procedures shall be in place to perform periodic background checks on staff;
    ii. Staff shall undergo adequate training to provide live game in a fair way according to

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documented procedures and game rules. Evidence of training and periodic refresher training shall be maintained;

iii. Staff shall be trained in, and regularly reminded of, any physical behavior which is prohibited or mandated (including hand signals, talking, the handling of the cards, etc.);

iv. Policies and procedures concerning rotations, shift patterns and allocation shall be documented, including how game attendants are allocated to tables/games (i.e., without prior knowledge of which tables/games they will be serving and with their time-on-game set at a level to deter harmful relationships being developed), and changes in game attendants during exceptional circumstances;

v. A method to reasonably detect players who reject tables/games and re-apply for another within the same game type on a consistent basis until they arrive at their preferred table/game;

vi. The retention of documentation shall be robust, allowing staff records to be audited and investigations to be performed where staff members are either involved directly or where their presence in a particular place and/or time, is crucial to understanding a chain of events;

vii. Procedures for the hiring and termination of staff shall be documented;

viii. A supervisory employee shall always be present when live games are taking place;

ix. Staffing logs shall be maintained for each table/game; and

e) Procedures shall be in place to inform in-person players that they are being filmed as part of a live feed.

f) Procedures regarding anomalous events which may occur during live games shall be documented and understood by staff, including, but not limited to:

i. Specialized device or physical randomness device malfunctions, including incorrect outcome detection;

ii. Dropped cards;

iii. Misdeals;

iv. Re-spins;

v. Aborted games; and

vi. Table/game closure.

g) Consistent card shuffling procedures, including a verification of the card count, frequency of shuffling, and cases for reshuffling, shall be in place. The shuffling of cards shall be logged.

h) A defined procedure shall exist for the accounting of the physical player chips.

i) Procedures shall be in place to demonstrate that a single member of staff would not be able to undertake all duties concerning game management and that there is segregation of responsibilities prior to play, during play and after play.

j) Procedures shall be in place to deal with player disconnection or any video, voice, or data stream disruptions during a live game.

k) Procedures shall be in place to ensure that for wagers placed on live games:

i. When wagers are placed by verbal instruction, the content of the wager is communicated back and acknowledged by the player before the wager is confirmed;

ii. When a game attendant is receiving wagers indicated by the player, a clear indication or notification if the wager has been accepted or rejected (in full or in part) is provided to the player; and

iii. The winning player is notified of their win, including the amount won, after the completion of the game and that their account balance is updated either immediately or once they exit

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the game.

l) Variations in the operation of card shufflers and shoes, roulette wheels, ball blowers, dice shakers or other live game equipment shall be incorporated into the game procedures to maintain randomness. This equipment shall have a level of randomness consistent with that seen in gaming venues to ensure their fairness and integrity.

m) Procedures shall be in place to ensure card shoes and similar specialized devices and physical randomness devices are tamper-proof once they have been loaded to preclude interference prior to and during play.

n) To ensure and maintain their integrity, any specialized devices and physical randomness devices shall be periodically inspected and tested for reliability. In addition:
   i. All consumables or live game equipment that will be subjected to this hardware shall be checked against it for defects prior to processing, to prevent play being disrupted; and
   ii. Logs of all tests shall be maintained.

o) There shall be procedures in place to inform the player when the manual operation mode of the specialized device is activated, and tracking shall be enabled to allow for further review.

p) Policies and procedures shall be in place to identify and replace specialized devices and physical randomness devices which show an unacceptable level of errors.

q) Procedures shall be in place to maintain game logs and collate game events into statistics which can be analyzed for trends relating to game performance, staff and/or locations in the live game environment, including those for supervisors, shifts, procedure violations, as well as other incidents, irregularities, and errors.

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Glossary of Key Terms

Access Control – The process of granting or denying specific requests for obtaining and using sensitive information and related services specific to a system; and to enter specific physical facilities which houses critical network or system infrastructure.

Advertised Award – An award that can be awarded by a game and which is explicitly advertised to the player in the game artwork.

Algorithm – A finite set of unambiguous instructions performed in a prescribed sequence to achieve a goal, especially a mathematical rule or procedure used to compute a desired result. Algorithms are the basis for most computer programming.

Alternative Game Mode – Any mode of gaming other than the normal mode of game play. This includes modes such as autoplay, tournament, and free play.

ARP, *Address Resolution Protocol* – The protocol used to translate IP addresses into MAC addresses to support communication on a wireless or wired local area network.

Artwork – The graphics, thematic art, help screens, and other textual information that is shown to a player by the player interface.

Audit Trail – A record showing who has accessed a system and what operations the user has performed during a given period.

Authentication – Verifying the identity of a user, process, software package, or device, often as a prerequisite to allowing access to resources in a system.

Automated Decision-Making – The ability to make decisions by technological means based on PII or data provided directly by players; data observed about players; derived or inferred data (e.g., risk rating). For any type of processing to be classed as automated rather than solely automated, there shall be meaningful human involvement in the process (for example through review or filtering) and that human involvement shall take place prior to the final decision.

Autoplay Mode – A player-selectable mode of a game that allows a player to place wagers automatically without any manual interaction, once a denomination, wager, and other play attributes have been selected for game play.

Backup – A copy of files and programs made to facilitate recovery if necessary.

Best-Hand Play – A collusion method where between two or more players only the one who has the best score always plays, while the other or others leave the game.

Biometrics – A biological identification input, such as fingerprints or retina patterns.

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Bonusing Award – An incentive award based on a game event or some external trigger which do not include triggers based upon specific player account activity. Examples include multiplied awards, whereby the game multiplies all wins within a specified range by a specified value or an nth coin award is won when a percentage of play on participating games reaches a randomly selected value.

Cache Poisoning – An attack where the attacker inserts corrupt data into the cache database of the Domain Name Service (DNS).

Chip Dumping – A collusion method where two or more players help each other to stay in the game, leading to losses and therefore to an exchange of chips even with certainly winning combinations.

Communications Technology – Any method used, and the components employed, to facilitate the transmission and receipt of information, including transmission and reception by systems using wire, wireless, cable, radio, microwave, light, fiber optics, satellite or computer data networks, including the Internet and intranets.

Community Bonus – A type of bonus/feature play where players collaborate and/or compete for a shared award.

Contributions – The financial method by which progressive jackpot or incrementing jackpot pools are funded.

Contingency Plan – Management policy and procedures designed to maintain or restore gaming operations, possibly at an alternate location, in the event of emergencies, system failures, or disaster.

Credit Meter – A meter which maintains the player funds available to the player for the commitment of a wager which is transferred to and from the player account balance.

Critical Component – Any sub-system for which failure or compromise can lead to loss of player entitlements, government revenue or unauthorized access to data used for generating reports for the regulatory body. Examples of critical components include: Components which record, store, process, share, transmit or retrieve PII and other sensitive information (e.g., validation numbers, authentication credentials, etc.); Components which generate, transmit, or process random numbers used to determine the outcome of games; Components which store results of the current state of a player's wager; Points of entry to and exit from the above components (other systems which communicate directly with core critical systems); and Communication networks which transmit PII and other sensitive information.

Critical Control Program – A software program that controls behaviors relative to any applicable technical standard and/or regulatory requirement.

Cryptographic RNG – A Random Number Generator (RNG) which is resistant to attack or compromise by an intelligent attacker with modern computational resources who has knowledge of

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the source code of the RNG and/or its algorithm. Cryptographic RNGs cannot be feasibly 'broken' to predict future values.

Data Integrity – The property that data is both accurate and consistent and has not been altered in an unauthorized manner in storage, during processing, and while in transit.

DDOS, *Distributed Denial of Service* – A type of attack where multiple compromised systems, usually infected with a destructive software program, are used to target a single system. Victims of a DDOS attack consist of both the end targeted system and all systems maliciously used and controlled by the hacker in the distributed attack.

Debit Instrument – A card, code, or other device with which a person may initiate an electronic funds transfer. The term includes, without limitation, a prepaid access instrument.

Direct Cryptanalytic Attack – An RNG attack whereby the attacker, given a sequence of past values produced by an RNG, is able to predict or estimate future RNG values.

Diversion Pool – The monies collected pursuant to a contribution schedule that are intended to be used for the funding of future progressive jackpots and incrementing jackpots or for other purposes.

DNS, *Domain Name Service* – The globally distributed internet database which (amongst other things) maps machine names to IP numbers and vice-versa.

Domain – A group of computers and devices on a network that are administered as a unit with common rules and procedures.

Double-Up (aka "Gamble") – An extended game play feature available to a player to double or risk current winnings.

DRP, *Disaster Recovery Plan* – A plan for processing critical applications and preventing loss of data in the event of a major hardware or software failure or destruction of facilities.

Effective Bandwidth – The amount of data that actually can be transferred across a network per unit of time. The effective bandwidth through the Internet is usually considerably lower than the bandwidth of any of the constituent links.

EFT, *Electronic Funds Transfer* (aka "ECT", "Electronic Credits Transfer") – An electronic transfer of funds from an independent financial institution to a player account using a payment service provider. This includes Automated Clearing House (ACH) transfers.

Encryption – The conversion of data into a form, called a ciphertext, which cannot be easily understood by unauthorized people.

Encryption Key – A cryptographic key that has been encrypted in order to disguise the value of the underlying plaintext.

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Firewall – A component of a computer system or network that is designed to block unauthorized access or traffic while still permitting outward communication.

Flight Recorder – Game recall functionality that records various player physical actions and correlates them in time to other game inputs such as touch screen activations, button presses, etc. in order to more fully reconstruct the outcome of game play. When used in conjunction with a game containing a physical skill element, such functionality may be especially useful for recording/documenting aspects of game history specific to a player's physicality, dexterity, motions, or gestures.

Free Play Mode – A game mode that allows a player to participate in a game without placing any wager, principally for the purpose of learning or understanding game play mechanics.

Game Cycle – A game cycle is defined as "wager to wager". The cycle is the period from an initial wager to the point of the final transfer to the player's credit meter or player account balance, or when all funds wagered are lost.

Game Theme (aka "Personality Program") – The concept, subject matter, and methodology of design in which a game is built around, including artwork, game graphics, one or more paytables, sound effects, and music.

Game with Skill – A wagered game in which the skill of the player, rather than pure chance, is a factor in affecting the outcome of the game as determined over a period of continuous play. A game with skill contains one or more elements of skill in its design which can be leveraged by a player to impact the return percentage.

Gaming Platform – The Interactive Gaming System hardware and software which drives the which may drive the features common to game offerings, game configurations, RNGs, reporting, etc.

Gaming Rules (aka "House Rules") – Any written, graphical, and auditory information compiled by the operator for the purpose of summarizing portions of the internal controls and certain other information necessary to inform the public of the functionality of the interactive gaming operations.

Gaming Session – The period of time commencing, at minimum, when a player initiates a game or series of games on a Gaming Platform for a particular game theme by committing a wager and ending at the time of a final game outcome for that game or series of games and coincident with the opportunity for the player to exit the game.

Geolocation – Identifying the real-world geographic location of an internet connected Remote Player Device.

Group Membership – A method of organizing user accounts into a single unit (by job position) whereby access to system functions may be modified at the unit level and the changes take effect for all user accounts assigned to the unit.

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Hardware-Based RNG – An RNG that derives its randomness from small-scale physical events such as electric circuit feedback, thermal noise, radioactive decay, photon spin, etc.

Hash Algorithm – A function that converts a data string into an alpha-numeric string output of fixed length.

HTTP, *Hypertext Transport Protocol* – The underlying protocol used to define how messages are formatted and transmitted, and what actions servers and browsers shall take in response to various commands.

Identifier – Any specific and verifiable fact concerning a player or group of players which is based upon objective criteria relating to the player or group of players and which may be utilized to affect some prescribed change to a game configuration.

Identity Verification Service Provider – An entity who verifies, or provides information for the verification of, the identification of individuals.

IDS/IPS, *Intrusion Detection System/Intrusion Prevention System* – A system that inspects all inbound and outbound network activity and identifies suspicious patterns that may indicate a network or system attack from someone attempting to break into or compromise a system. Used in computer security, intrusion detection refers to the process of monitoring computer and network activities and analyzing those events to look for signs of intrusion in your system.

Incentive Credits and/or Prizes (aka "Incentive Awards") – Credits and/or prizes that are not described in the paytable of a game, that is based upon predetermined events or criteria established by the parameters of the Interactive Gaming System. An incentive award may be a promotional award or a bonusing award.

Increment Rate – The configurable or hardcoded value used to increment the progressive jackpot or incrementing jackpot.

Incrementing Jackpot – A monetary award or "payoff" which increases on the occurrence of one or more specific conditions (defined events) established by the rules of the game. In addition to the defined event(s), it is acceptable for incrementing jackpots to also increase according to the credits wagered in the game. An example of this would be an incrementing jackpot which increases every time you get a specific win in a bonus.

Information Security – Protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide integrity, confidentiality, and availability

Information Security Service Provider – An entity who provides management, support, security, or disaster recovery services for regulated hardware or software.

Interactive Gaming – Gaming, conducted through the use of communications technology, which uses an element of chance, skill, or strategy, or some combination of these elements in the

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determination of awards, contain some form of activation to initiate the selection process, and makes use of a suitable methodology for delivery of the determined outcome to the Remote Player Device.

Interactive Gaming System – The hardware, software, firmware, communications technology, other equipment, as well as operator procedures implemented in order to allow player participation in gaming, and, if supported, the corresponding equipment related to the display of the game outcomes, and other similar information necessary to facilitate player participation. The system provides the player with the means to play games. The system provides the operator with the means to review player accounts, disable games, generate various gaming/financial transaction and account reports, input outcomes for live games, and set any configurable parameters.

Internet – An interconnected system of networks that connects computers around the world via TCP/IP.

IP Address, *Internet Protocol Address* – A unique number for a computer that is used to determine where messages transmitted on the Internet should be delivered. The IP address is analogous to a house number for ordinary postal mail.

ISMS, *Information Security Management System* – A defined, documented management system that consists of a set of policies, processes, and systems to manage risks to organizational data, with the objective of ensuring acceptable levels of information security risk.

Jackpot Display – A display which is used to indicate the progressive jackpot or incrementing jackpot information.

Jackpot Diversion Scheme – A portion of the jackpot contributions are diverted to another pool or "diversion pool" to be used as needed by the design of the progressive jackpot or incrementing jackpot (e.g., the diversion pool may be added to the reset value of the next jackpot or be used to pay simultaneous wins of a jackpot)

Jailbreaking – Modifying a smartphone or other electronic device to remove restrictions imposed by the manufacturer or operator to allow the installation of unauthorized software.

Key – A value used to control cryptographic operations, such as decryption, encryption, signature generation or signature verification.

Key Management – Activities involving the handling of cryptographic keys and other related security parameters (e.g., passwords) during the entire life cycle of the keys, including their generation, storage, establishment, entry and output, and zeroization.

Known Input Attack – An RNG attack whereby the attacker is able to compromise an RNG by determining or estimating the state of the RNG after initial seeding.

Link Utilization – The percentage time that a communications link is engaged in transmitting data.

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Live Event Wagering – The wagering on live sports, competitions, matches, and other live event types approved by the regulatory body where the player places wagers on markets within a live event.

Live Game – A game conducted by a gaming attendant (e.g., dealer, croupier, etc.) and/or other gaming equipment (e.g., automated roulette wheel, ball blower, gaming device, etc.) in a live game environment in which players have the ability to review game play and communicate game decisions through the Gaming Platform. Live games include, but are not limited to, live drawings, live card games, live table games, live keno games, live bingo games, and live play of gaming devices or other games as allowed by the regulatory body.

Live Game Environment – A physical location that utilizes live video streaming technology to provide live games to a Remote Player Device that permits the player to participate in live streamed games, interact with game attendants, and interact with fellow players.

Location Service Provider – An entity who identifies, or provides information for the identification of, the geographic location of individuals.

MAC, *Message Authentication Code* – A cryptographic checksum on data that uses a symmetric key to detect both accidental and intentional modifications of the data.

Malware – A program that is inserted into a system, usually covertly, with the intent of compromising the confidentiality, integrity, or availability of the victim's data, applications, or operating system or of otherwise annoying or disrupting the victim.

"Man-In-The-Middle" Attack – An attack where the attacker secretly relays and possibly alters the communication between two parties who believe they are directly communicating with each other.

Mapping Algorithm – An algorithm or method by which a value is associated to a symbol or object that is usable and applicable to the current game (e.g.: the value 51 might be mapped to an ace of spades).

Mechanical RNG (aka "Physical Randomness Device") – An RNG that generates outcomes mechanically, employing the laws of physics. Live game implementations include, but are not limited to, mechanical wheels, tumblers, blowers, shufflers, etc.

Message Authentication – A security measure designed to establish the authenticity of a message by means of an authenticator within the transmission derived from certain predetermined elements of the message itself.

Mobile Code – Executable code that moves from computer to computer, including both legitimate code and malicious code such as computer viruses.

Multi-Factor Authentication – A type of authentication which uses two or more of the following to verify a user's identity: Information known only to the user (e.g., a password, pattern or answers to challenge questions); An item possessed by a user (e.g., an electronic token, physical token or an

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identification card); A user's biometric data (e.g., fingerprints, facial or voice recognition).

Multi-Wager Game – A game where multiple, independent wagers can simultaneously be applied towards advertised awards.

Mystery Award – An award paid by a game that is not associated with a specific paytable combination.

NCE, *Network Communication Equipment* – One or more devices that controls data communication in a system including, but not limited to, cables, switches, hubs, routers, wireless access points, and telephones

Near Miss – Showing a top award winning combination above or below an active payline.

Non-Wager Purchase – A purchase made by the player that debits the credit meter or player account balance and which is used for entertainment purposes only. A non-wager purchase does not influence the outcome of the game. An example might be the purchase of an artistic attribute of a game.

Operator – A person or entity that operates an Interactive Gaming System, using both the technological capabilities of the Interactive Gaming System as well as their own internal procedures.

Overflow – Pool containing the contributions which exceed the progressive jackpot or incrementing jackpot ceiling.

P2P Gaming Sessions, *Peer-to-Peer Gaming Sessions* – Environments which offer players the opportunity to play with and against each other. In these environments, the operator usually does not engage in the gaming session as a party (e.g., house-banked gaming), but usually provides the environment for use by its players, and takes a rake, commission, or fee for the service.

PAR Sheet – A specification sheet for a game that provides the theoretical return to player, hit frequency, symbol combination, number of reels, number of credits that can be accepted, and reel strip listing as applicable.

Password – A string of characters (letters, numbers, and other symbols) used to authenticate an identity or to verify access authorization.

Payment Service Provider – An entity who directly facilitates the depositing of funds into or withdrawing of funds from player accounts.

Paytable (aka "Variation") – The mathematical behavior of a game based upon the data from the manufacturer's PAR sheet, inclusive of the return percentage, and reflective of all possible payouts/awards.

Perfecta (aka "Exacta") – A wager in which the player picks the first and second place finishers in a

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competition in the correct order.

Persistence Game – A game that is associated with a unique attribute (e.g., player ID, game theme/paytable ID, etc.) and incorporates a feature that enables progress towards the award of game play enhancements and/or bonuses through the achievement of some designated game outcome.

Physics Engine – Specialized software that approximates the laws of physics, including behaviors such as motion, gravity, speed, acceleration, mass, etc. for a game's elements or objects. The physics engine is utilized to place game elements/objects into the context of the physical world when rendering computer graphics or video simulations.

PII, *Personally identifiable information* – Sensitive information that could potentially be used to identify a particular player. Examples include a legal name, date of birth, place of birth, social security number (or equivalent government identification number), driver's license number, passport number, residential address, phone number, email address, debit instrument number, credit card number, bank account number, or other personal information if defined by the regulatory body.

PIN, *Personal Identification Number* – A numerical code associated with an individual and which allows secure access to a domain, account, network, system, etc.

Play from Save – A feature utilized in some persistence game designs where complexity increases, or additional elements are added to the game, as play continues. A player is able to save their progress and resume from the saved point of game play.

Player Account (aka "Wagering Account") – An account maintained for a player where information relative to gaming and financial transactions are recorded on behalf of the player including, but not limited to, deposits, withdrawals, wagers, winnings, and balance adjustments. The term does not include an account used solely by an operator to track incentive points or credits or similar benefits issued by an operator to a player which may be redeemed for merchandise and/or services.

Player Interaction Device – An internal or external device that connects to a machine and that registers various types of player inputs allowing the player to interact with the machine. Several examples include touch screens, joysticks, handheld controllers, camera systems, etc. The player interaction device may be hard-wired or wireless. A "smart" player interaction device supports two-way communications with the Gaming Platform. For the purpose of this technical standard, a traditional keyboard is excluded from this definition unless it is used to affect the outcome for a game.

Player Interface – An interface application or program through which the user views and/or interacts with the Player Software to communicate their actions to the Interactive Gaming System.

Player Loyalty Program – A program that provides incentive awards for players based on the volume of play or revenue received from a player.

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Player Software – The software used to take part in gaming and financial transactions with the Interactive Gaming System which, based on design, is downloaded to or installed on the Remote Player Device, run from the Interactive Gaming System which is accessed by the Remote Player Device, or a combination of the two. Examples of Player Software include proprietary download software packages, html, flash, etc.

Pool – An accumulated reservoir of progressive jackpot or incrementing jackpot monetary contributions.

Port – A physical entry or exit point of a module that provides access to the module for physical signals, represented by logical information flows (physically separated ports do not share the same physical pin or wire).

Prepaid Access Instrument – A card, code, electronic serial number, mobile identification number, personal identification number or similar device used in conjunction with an Interactive Gaming System that allows player access to funds that have been paid in advance and can be retrieved or transferred at some point in the future through such a device.

Profiling – Any form of automated processing of PII consisting of the use of PII gathered from various sources to evaluate certain personal aspects relating to a natural person, in particular to analyze or predict aspects concerning that natural person's economic situation, personal preferences, interests, reliability, behavior, location, etc.

Proxy – An application that "breaks" the connection between client and server. The proxy accepts certain types of traffic entering or leaving a network and processes it and forwards it. This effectively closes the straight path between the internal and external networks. Making it more difficult for an attacker to obtain internal addresses and other details of the internal network.

Progressive Jackpot – A monetary award or "payoff" that increases according to the credits wagered in the game.

Promotional Award – An incentive award based on predefined player activity criteria that are tied to a specific player account, which generally recur. Examples include earning restricted credits which match their first deposit, awarding points for a certain amount of credits played on a game; awarding credits for wagering more than a certain amount of credits within a specific time period.

Proposition Player – A player that has been hired to participate in a game and wagers personal funds.

Protocol – A set of rules and conventions that specifies information exchange between devices, through a network or other media.

Quinella – A wager in which the first two places in a competition shall be predicted, but not necessarily in the finishing order.

Rake, Commission, or Fee – An amount retained and not distributed by the operator from the

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total amount wagered on a game.

Remote Access – Any access from outside the system or system network including any access from other networks within the same site or venue.

Remote Player Device – A player-owned device that at a minimum will be used for the execution of game play. Examples of a Remote Player Device include a personal computer, mobile phone, tablet, etc.

Reset Value – The amount of a progressive jackpot or incrementing jackpot payoff initially offered before it increases.

Restricted Incentive Credits (aka "Non-Cashable Incentive Credits") – Incentive awards that either have no cash redemption value or cannot be cashed out until a wagering requirement or other restrictions associated with the credits is met.

Restricted Player Funds – Player funds that are not redeemable for cash, including restricted incentive credits.

Risk – The likelihood of a threat being successful in its attack against a network or system.

RNG, *Random Number Generator* – A computational or physical device, algorithm, or system designed to produce numbers in a manner indistinguishable from random selection.

RNG Period – The length of the ordered sequence of raw numbers output by the RNG. When the RNG is cyclic, it has a finite period. Otherwise, the RNG is said to have an infinite period.

RNG State – The state defined by one or more variables in computer memory and represents a specific point within the cycle of the RNG. RNG state may be modified by replacing one or more of these variables with new values, or otherwise mixing the values with new data.

Rooting – Attaining root access to the operating system code to modify the software code on the mobile phone or other Remote Player Device or install software that the manufacturer would not allow to be installed.

RTP, *Return to Player* – A ratio of the 'total amount won' to the 'total amount wagered' by a player. Such a return may be "theoretical" (based on mathematical calculations or simulations) or "actual" (based on the metering supported by an enabled game).

Scaling Algorithm – An algorithm or method by which the numbers selected by an RNG are scaled or mapped from a greater range to a lesser range for use in the game.

Secure Communication Protocol – A communication protocol that provides the appropriate confidentiality, authentication and content integrity protection.

Security Certificate – Information, often stored as a text file that is used by the Transport Socket

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Layer (TSL) Protocol to establish a secure connection. In order for an TSL connection to be created, both sides shall have a valid Security Certificate.

Security Policy – A document that delineates the security management structure and clearly assigns security responsibilities and lays the foundation necessary to reliably measure progress and compliance

Seeding / Seed – The initialization of the state variables of an RNG. The source value or values used for initialization is the seed.

Sensitive Information – Information such as PII, gaming data, validation numbers, authentication credentials, PINs, passwords, secure seeds and keys, and other data that shall be handled in a secure manner.

Server – A running instance of software that is capable of accepting requests from clients, and the computer that executes such software. Servers operate within a Client-Server Architecture, in which "servers" are computer programs running to serve the requests of other programs ("clients"). In this case the "server" would be the Interactive Gaming System and the "clients" would be the Remote Player Devices.

Shellcode – A small piece of code used as a payload in the exploitation of security. Shellcode exploits vulnerability and allows an attacker the ability to reduce a system's information assurance.

Shill – A player that has been hired to participate in a game and wagers funds on behalf of the operator.

Shuffling Algorithm – An algorithm or method by which RNG output is used to produce without replacement data, or, equivalently, to randomize the order of multiple objects. All possible orderings are intended to be equally likely.

Soft-Play – A collusion method where one or more players renounce to play against another player in situations where such behavior is unreasonable in accordance with normal practices of play (for example, a player leaves the game even if the win is secure).

Software RNG – An RNG that derives its randomness from a computer-based or software-driven algorithm.

Source Code – A text listing of commands to be compiled or assembled into an executable computer program.

Startup Value – The initial progressive jackpot or incrementing jackpot value (does not include values from overflow or diversion pools).

State Compromise Extension Attack – An RNG attack in which an attacker compromises a single state of the RNG and penetrates past or future outputs of the RNG using this information. Usually this attack is executed using the seed state or a vulnerable state in which insufficient entropy is

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available.

Stateless Protocol – A communications scheme that treats each request as an independent transaction that is unrelated to any previous request so that the communication consists of independent pairs of requests and responses.

Surrender – An option available in some card games where the player can forfeit half of their wager rather than play out their active hand of cards. There are two types of surrender: early and late. These terms refer to whether or not a dealer checks to see if she/he has a blackjack (when an Ace or 10 is showing) before the player makes the surrender decision.

System Administrator – The individual(s) responsible for maintaining the stable operation of the Interactive Gaming System (including software and hardware infrastructure and application software).

TCP/IP, *Transmission Control Protocol/Internet Protocol* – The suite of communications protocols used to connect hosts on the Internet.

Third-Party Service Provider – An entity who acts on behalf of an operator to provide services used for the overall conduct of interactive gaming.

Threat – Any circumstance or event with the potential to adversely impact network operations (including mission, functions, image, or reputation), assets, or individuals through a system via unauthorized access, destruction, disclosure, modification of information, and/or denial of service. Also, the potential for a threat-source to successfully exploit a system vulnerability.

Time Stamp – A record of the current value of the Interactive Gaming System date and time which is added to a message at the time the message is created.

Touch Screen – A video display device that also acts as a player input device by using electrical touch point locations on the display screen.

Tournament (aka "Contest/Tournament") – An organized, measured event that permits a player to engage in competitive play against other players. An out-of-revenue tournament involves only non-wagered play using tournament credits or points that have no cash value. In contrast, an in-revenue tournament allows for wagered play in conjunction with the operation of the tournament.

Trifecta – A wager in which a player wins by selecting the first three finishers of a competition in the correct order of finish.

Unauthorized Access – A person gains logical or physical access without permission to a network, system, application, data, or other resource.

Unrestricted Incentive Credits (aka "Cashable Incentive Credits") – Incentive awards that are redeemable for cash.

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Unrestricted Player Funds – Player funds that are redeemable for cash, including unrestricted incentive credits.

Version Control – The method by which an evolving approved Interactive Gaming System is verified to be operating in an approved state.

Virtual Event Wagering – A form of wagering that allows for the placement of wagers on sports, contests, and matches whose results are determined solely by an approved Random Number Generator (RNG).

Virtual Opponent – A computer-based player that participates in a game with skill and effectively mimics the actions of a live player.

Virus – A self-replicating program, typically with malicious intent, that runs and spreads by modifying other programs or files.

Virus Scanner – Software used to prevent, detect and remove computer viruses, including malware, worms and Trojan horses.

VPN, *Virtual Private Network* – A logical network that is established over an existing physical network and which typically does not include every node present on the physical network.

Vulnerability – Software, hardware, or other weaknesses in a network or system that can provide a "door" to introducing a threat.

Wager – Any commitment of credits or money by the player which has an impact on game outcome.

Wi-Fi – The standard wireless local area network (WLAN) technology for connecting computers and electronic devices to each other and/or to the internet.

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