LIQUID AND GRIT

Social Casino Product Report

Competitive research and actionable product recommendations



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OCTOBER

2016

INTRODUCTION

Dear Product Owner,

The inventor of the Toyota Production System, Taiichi Ohno, said, "The Toyota style is not to create results by working hard. It is a system that says there is no limit to people's creativity. People don't go to Toyota to work they go there to think."

The bingo market is an opportunity for the next breakout game—like Old Vegas Slots in 2014, Scatter Slots in 2015, and Viva Slots Las Vegas in 2016. However, it will take creativity and a fresh, well-integrated product. To start the process, the 12 top grossing bingo games are reviewed in the Key Recommendations section.

Quick Wins details some of the most innovative features to date, including Hidden Packages, which is a unique way to increase revenue per transaction by hiding the coin amounts on the buy page.

All major product releases from the top grossing social casino games are covered in the Market Watch. This month includes details on Slotomania, Hit it Rich!, WSOP, Infinity Slots, and more.

You will find an economy teardown of Classic Slots. Released in June 2016, it is already the 70th top grossing game. We've supplied economy info comparing both casual and classic slots games.

New Machine Releases includes the volatility index and RTP range of three new machines based on 1,000 spins. We applied an RMG industry practice to provide information on machines with a 90% confidence level. See the Appendix for details on this approach.

All the best,

Brett Nowak Editor-in-Chief



KEY FEATURES

KEY FEATURES

Consider launching a bingo game targeting more hard-core players. Increase revenue per transaction with hidden packages. Improve game retention with a mechanic that allows players to delete unused machines

Feature	KPIs	
Bingo	Drive retention	 Build a hard-co auto-daubing a
Hidden Packages	 Increase revenue per transaction 	 Create and ma
Delete Unused Machines	 Improve retention 	 Decrease stora used slots mad
Viral Collections	 Generate reactivations 	 Add this strong share with frier
Mystery Box Packages	 Increase conversion 	 Test a purchas sandwich-card

Recommendations

core bingo game—like Viva Slots Las Vegas, but for bingo—with simplified content, and rewards

arket a buy page mystery package for a significant sale price

rage space and increase loading times by allowing players to delete infrequently achines

g progression system to viral flows that upgrades as players win at bingo and ends

se mechanic that includes a mystery box, price increase, scratcher card, and a d mechanic

BOLD BEAT: BINGO

MARKET COMPARISON

exist for more hard-core games with unlocked rooms, auto-daubed bingo play, and rewards

	Collections	Progression	Achievements	Chat	Leaderboards	Rewards	Auto-daub
Bingo Bash	\checkmark	\checkmark	\checkmark	\checkmark			
Bingo Blitz	\checkmark	\checkmark	\checkmark	\checkmark		\checkmark	
Bingo Pop	\checkmark	✓	\checkmark		\checkmark		\checkmark
Monopoly Bingo	\checkmark	✓	\checkmark				
Bingo Showdown	\checkmark				\checkmark		✓ (catch-up)
Bingo!	\checkmark	\checkmark	\checkmark				
Bingo Heaven	\checkmark	\checkmark	✓ (goals)				
Bingo Lane	\checkmark	\checkmark	\checkmark	\checkmark			✓ (catch-up)
CLUE Bingo	\checkmark	\checkmark	\checkmark				
Bingo PartyLand	\checkmark	\checkmark	\checkmark		\checkmark		
Bingo Island		\checkmark		\checkmark			✓ (select rooms)
Price is Right Bingo	\checkmark	\checkmark	✓ (3 rd party*)	\checkmark		 ✓ (3rd party*) 	

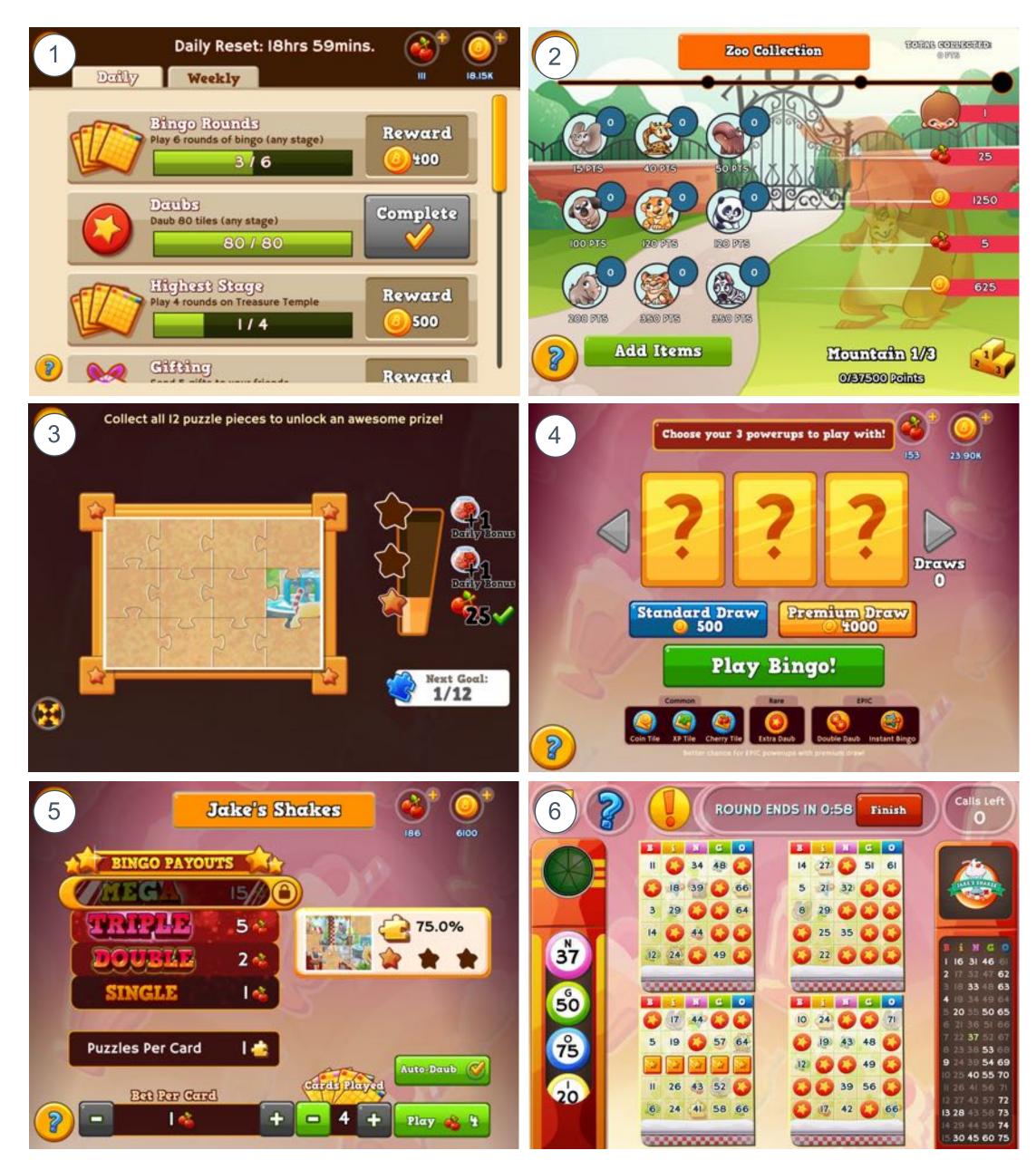
*Feature is provided to players by a third party service

The 12 top grossing bingo games are heavily focused on collections and achievements. Opportunities

BINGO POP

Bingo Pop provides players with collection and completion mechanics

- Bingo Pop offers players many daily goals, including bingo rounds, daubs, gifting, bingos, and more (image 1).
- Bingo Pop has a very involved collection feature that focuses on tiny animals (image 2).
- At the end of each bingo round, players receive a comprehensive list of items they collected. Along with these items, players receive pieces to complete a twelve-piece puzzle (image 3).
- Upon room-load, players are presented with a gotcha mechanic attached to the powerups. Players either play without powerups or pick three from a standard or premium draw of cards (image 4).
- Upon game-load, players may pick their bet. The Mega payout is unlocked at level five (image 5).
- The bingo room gives auto-daubing to players for free but has no social chat features (image 6).



BINGO SHOWDOWN

Focuses on bingo skills with a leaderboard and catch up auto-daubing prior to game play

- In Bingo Showdown, tournaments house all active players in one room (image 1).
- Players can join a tournament at any time. When they enter the room, there is a catch up feature that auto-daubs all previously selected balls, however, there is no auto-daubing during game play (image 2).
- The game features a puzzle mechanic that awards players \$15 worth of tickets if completed (image 3).
- After each game, there is a leaderboard where players compete based on bingos and spots marked (image 4).
- Players receive a chest for every bingo achieved and ten chests lead to a prize (image 5).
- There are also mini-games that are awarded during play. The minigames themselves are very similar to slots bonus games (image 6).

Image: state stat	Level: 2 Morr 59:39 Powerups Minigames You''re All Caught Up! You''re All Caught Up! You''re All Caught Up! Wore You''re All Caught Up! You''re All Caught Up! 11 28 42 52 11 28 42 52 12 25 74 12 25 75 9 16 33 49 73 9 16 33 49 73 15 16 36 55 64 8 20 40 54 66 14 24 37 71
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CLUE BINGO

A story-based game with core game play tied to solving the CLUE mystery

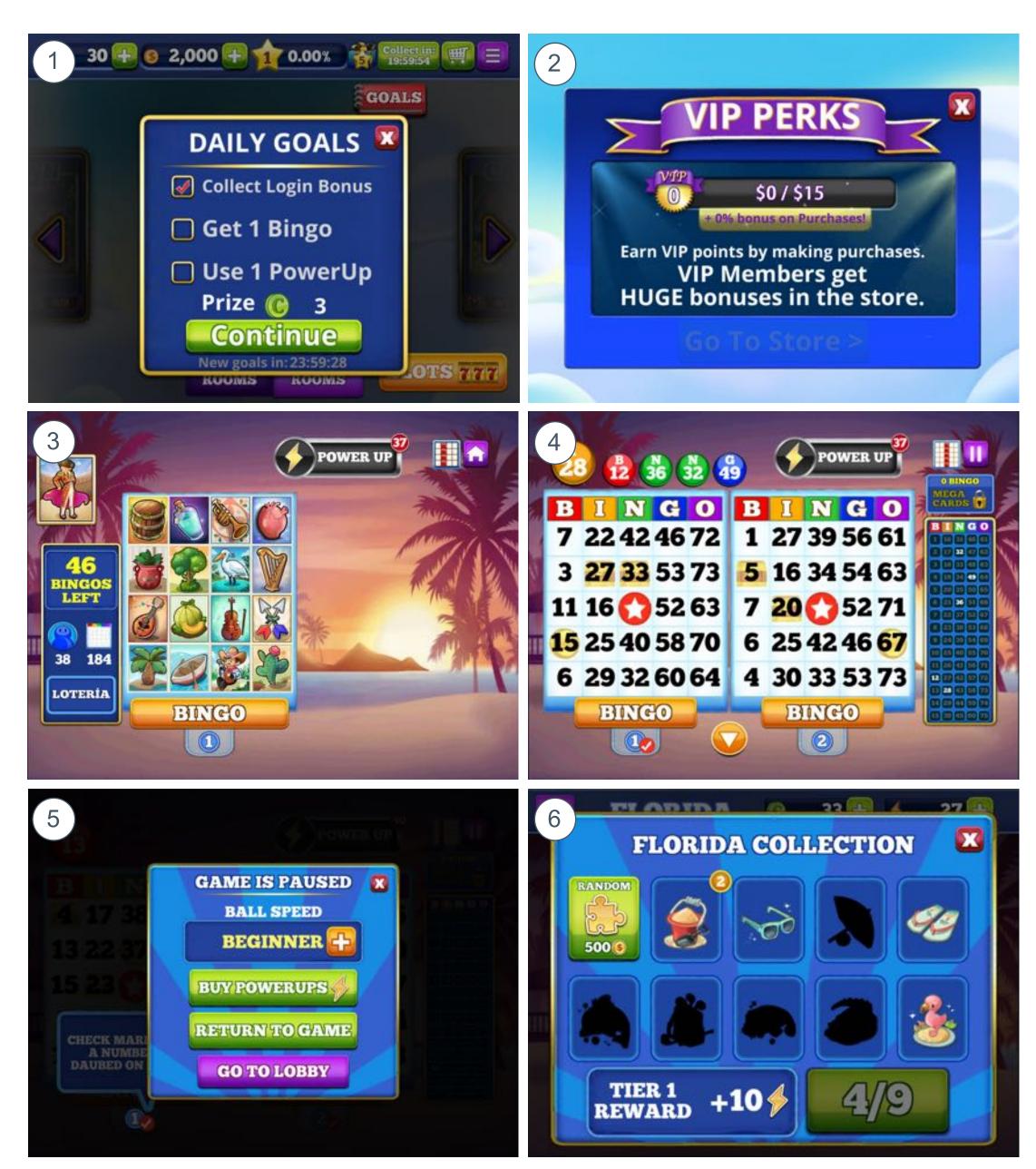
- Upon app-load, players are presented with a story-based image of a man murdered at the bottom of the stairs (image 1).
- There is an elaborate, themed collection system that helps players solve the mystery (image 2).
- The achievements system is focused on core game play—levels, daubing, jackpots, and hall master level (image 3).
- Players can eventually play up to 12 cards in one session (image 4).
- There is no free auto-daubing or social features. To allow for more than four cards, players have a ladder-like system on the left side of the screen to swap through cards (image 5).
- After each session, players receive envelopes with items to solve the mystery, tying in game play to the story (image 6).



BINGO HEAVEN

Wide range of mechanics offered to players, including goals, VIP perks, classic and special rooms, slots machines, and collections

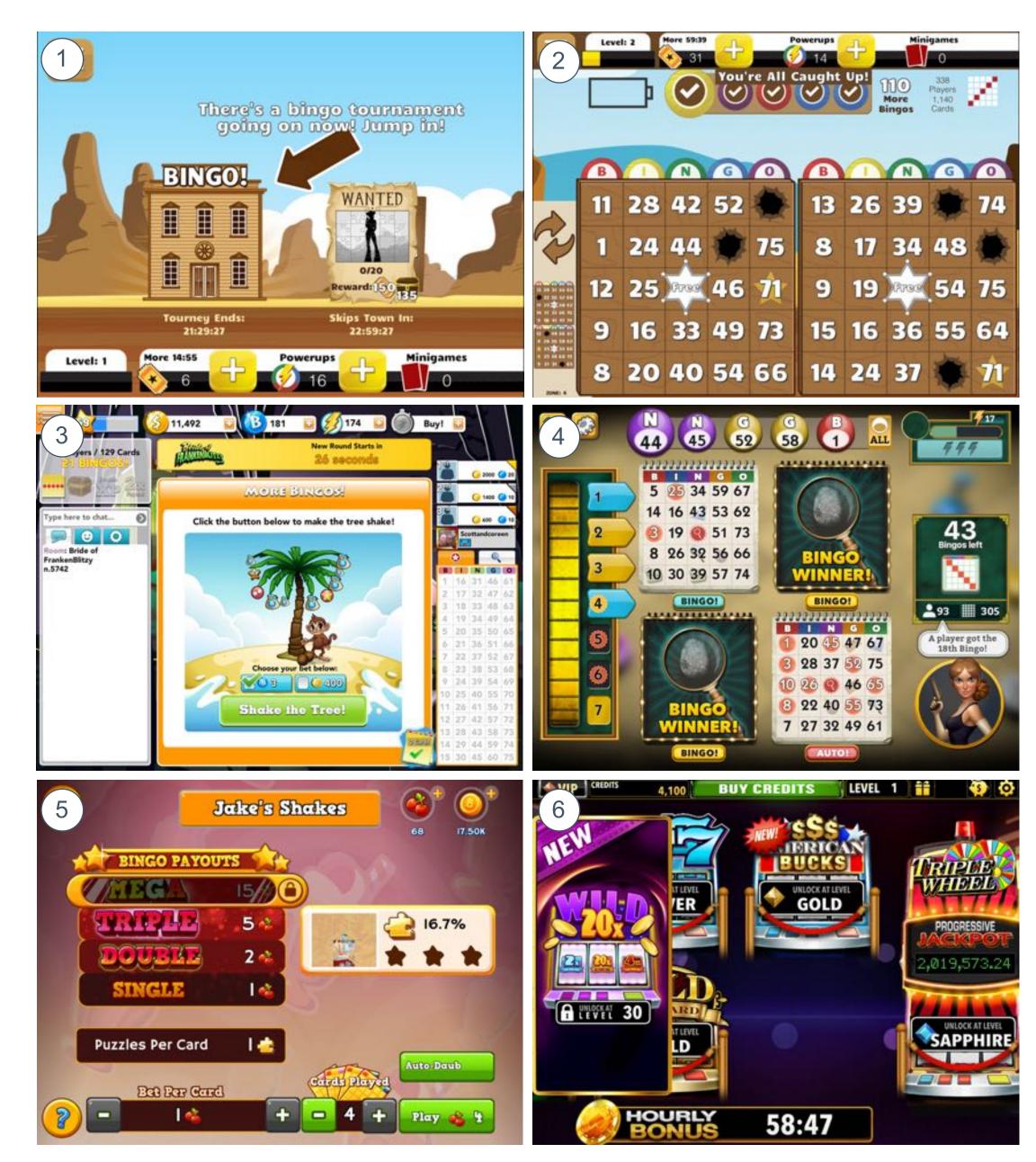
- Bingo Heaven, a Super Lucky Casino game, has daily goals very similar to their slots games (image 1).
- VIP perks are earned with purchases (image 2).
- Bingo Heaven offers classic and special rooms—classic rooms contain cards with numbers and special rooms contain image-based cards (image 3).
- In four card mode, players switch between cards using the down arrow to swap to the other two cards. A small check mark appears at the bottom of the card when players miss a daub (image 4).
- There are adjustments for ball speed, a nice add-on feature for older players (image 5).
- There is a classic gotcha mechanic in the collection feature—players win a random puzzle and then pay to unlock the pieces (image 6).



RECOMMENDATIONS

Build a hard-core bingo game—like Viva Slots Las Vegas, but for bingo—with simplified content, auto-daubing, and rewards

- Release just one room for a new game: Like Bingo Showdown, release one room to overcome limited concurrent players (image 1).
- Make the game single player initially and allow players to pause the game: Players may pause the game in Bingo Heaven. There are no social features so they can return whenever they like.
- Add a catch up mechanic to eliminate wait times: In Bingo Showdown, players may quickly join a session (image 2).
- When players must wait, add a mini-game like shake the tree: In Bingo Blitz, players can make a bet with the shake the tree feature while they wait for a game to begin (image 3).
- Turn on auto-daubing for players and provide the option for 12 or more cards: Like in Bingo Pop, give auto-daubing to all players. Then allow players to have up to 12 cards (and even more) at once to increase odds of a bingo win for whales—like in CLUE Bingo (image 4).
- Add progressive jackpots to each room: Like in Bingo Pop, add in a progressive jackpot mechanic (image 5).
- Provide players with a comprehensive rewards program: Bingo Blitz is the only top grossing bingo game with an in-game rewards program. Provide benefits different from Bingo Blitz—such as Viva Slots Las Vegas' content unlocked by tier (image 6).



QUICK WINS

- Polish Items

 Hidden Packages • Delete Unused Machines Viral Collections • Mystery Box Packages

HIDDEN PACKAGES

Create and market a buy page hidden package with a significant increase in bonus chips

- Upon app-entry in Slots Bonanza, players are enticed to check out the \$49.99 package with a call-to-action button, 'Peek inside' (image 1).
- The \$49.99 package omits information about free coins and totals (image 2).
- Clicking the buy button triggers the Apple iTunes password (image 3). This is an important step because it unlocks the 15 minute purchase window.
- The package information does not include the coin amount (image 4).
- If players click cancel, they go back to the buy page (image 5).
- If a player then re-clicks the buy button (which happens frequently as players explore whether the hidden package will be displayed), the player immediately goes to the second step in the Apple purchase flow (image 6).
- The hidden \$49.99 package pays out 950M coins, which is actually 50K more coins than the \$99.99 package.

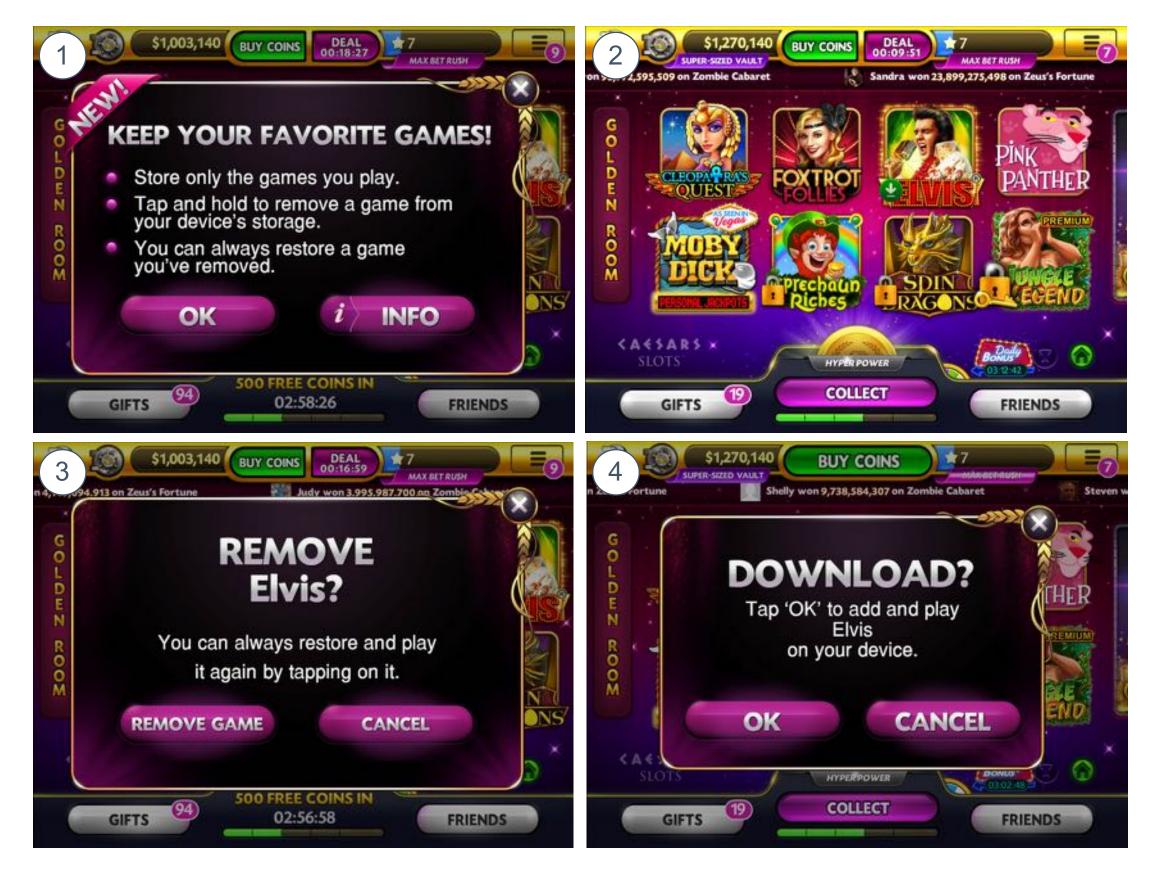


DELETE UNUSED MACHINES

Decrease storage space and increase loading times by allowing players to delete infrequently used slots machines

- In Caesar's Casino, as players return to the lobby a dialogue box appears informing players they can remove games from their device's storage (image 1).
- Clicking ok takes players to the lobby where they can easily click and hold down on a machine—like they would to delete an app on their iPhone—to delete a machine (image 2).
- A dialogue box appears before the machine is deleted to confirm that players want to delete the machine (image 3).
- Players can easily download the original machine again if desired. Clicking to download also surfaces a confirmation dialogue box (image 4).
- Review Content Downloads from our May 2016 Social Casino **Product Report for additional features to improve download** size and speed.

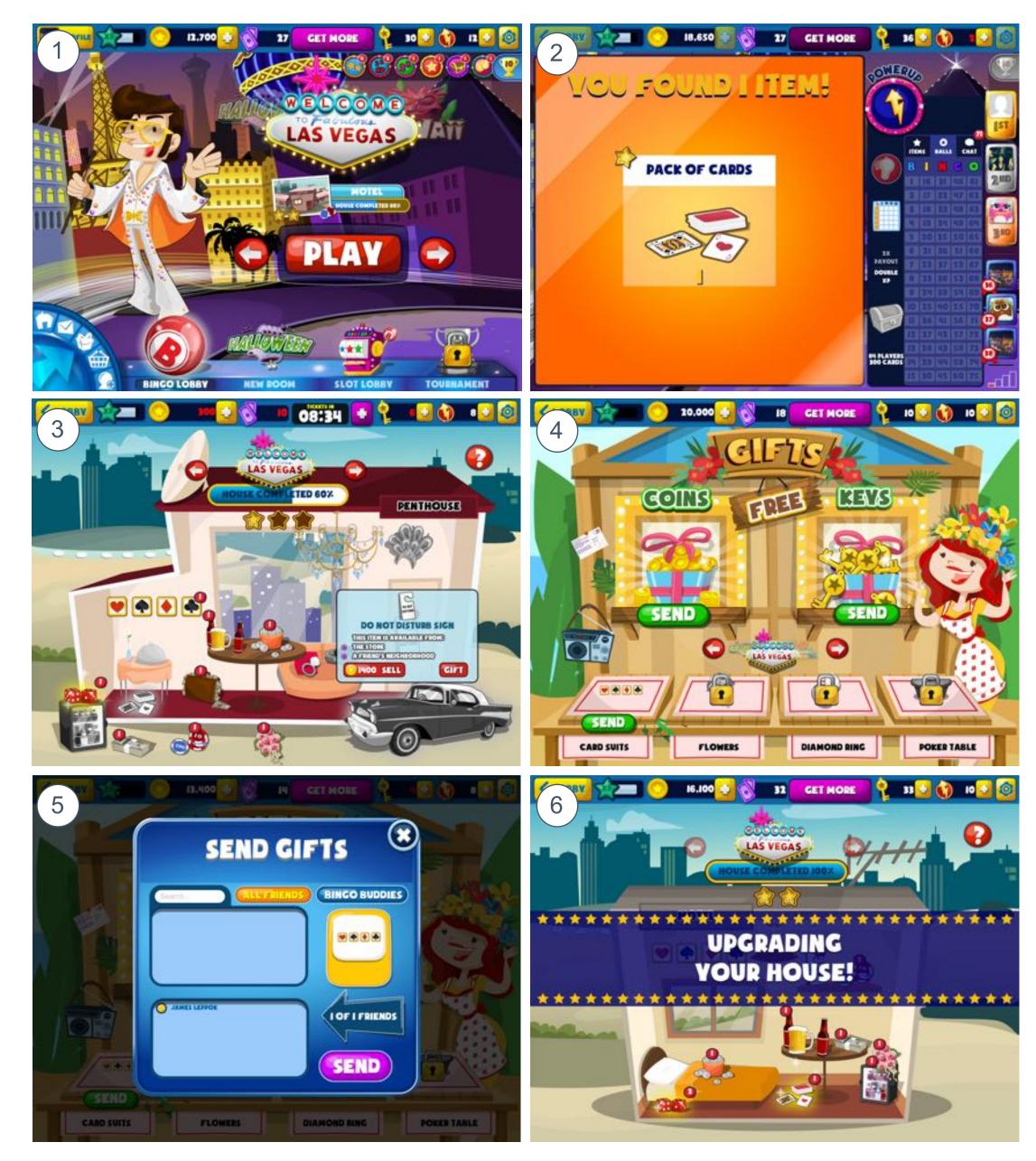




VIRAL COLLECTIONS

Add this strong progression system to viral flows that upgrades as players win at bingo and share with friends

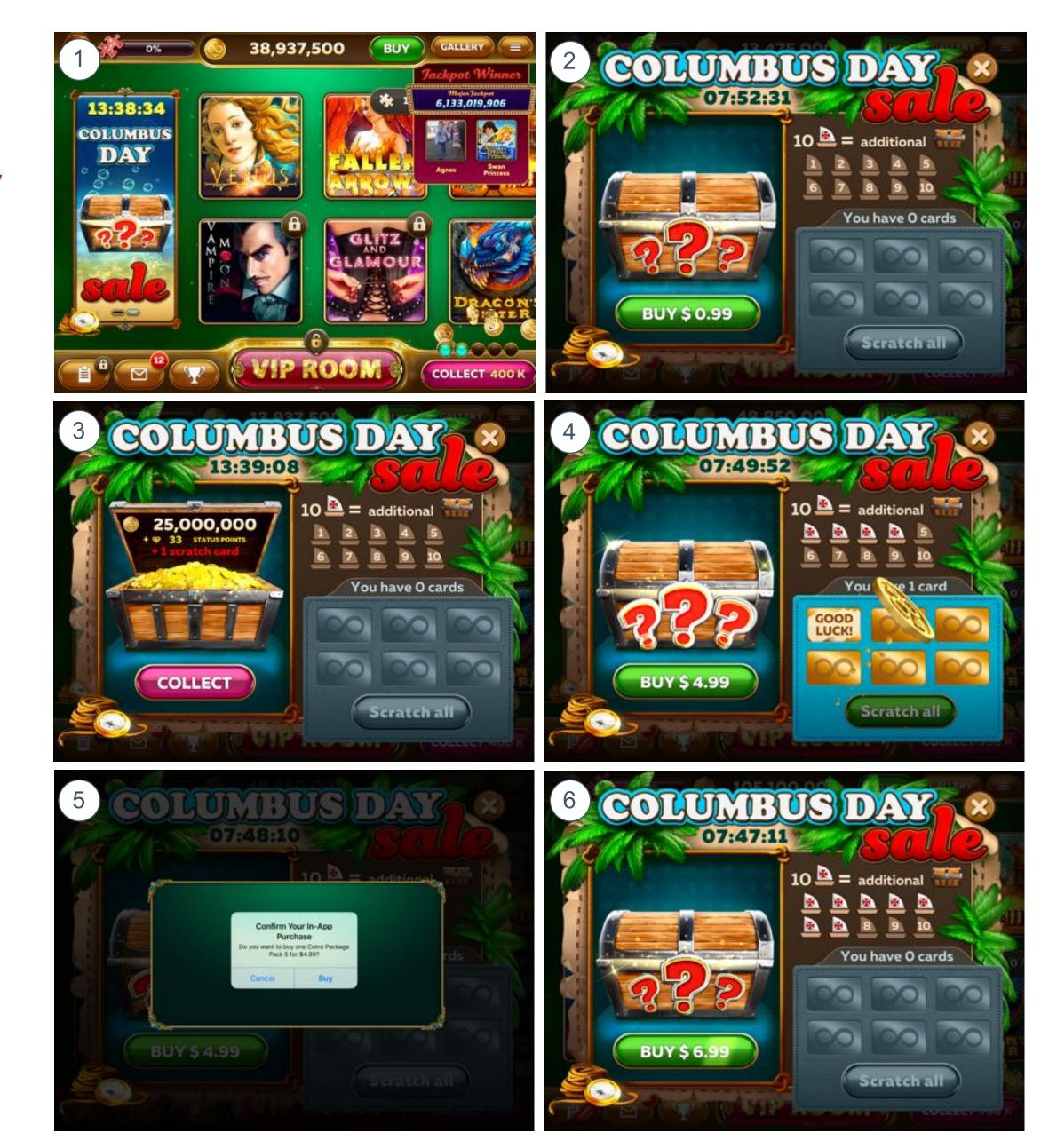
- In Bingo Lane, each bingo room has a structure, like a house, neighborhood, or in this case, a motel (image 1). Players may collect up to 20 different items to upgrade their structures.
- Players collect items by in store purchases, gifts from friends, and bingo play (image 2).
- Clicking on items within a house displays how items can be acquired and sold to other players (image 3).
- Players may send items from the gift store. The items are unlocked based on game level. Gifts range from coins, keys, and items needed for different levels and game rooms (image 4).
- Players are able to send gifts to Facebook friends or Bingo Lane buddies using a themed friend selector (image 5).
- When a player collects all necessary items for their current house, it will be sold and upgraded to the next level until all collection items for that specific theme have been acquired. The houses improve as they are upgraded (image 6).



MYSTERY BOX PACKAGES

Test a purchase mechanic that includes a mystery box, price increase, scratcher card, and a sandwich-card mechanic

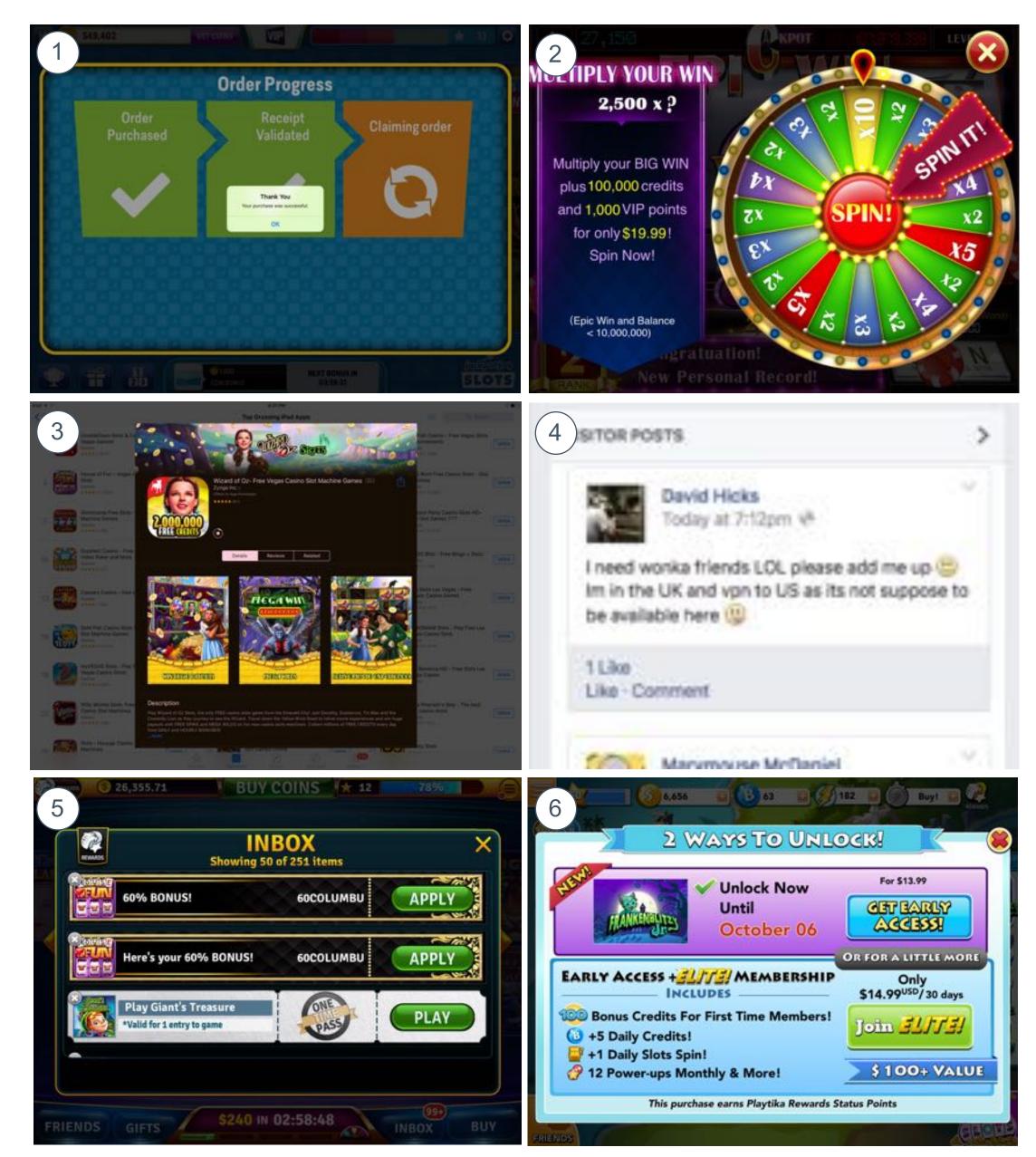
- Upon app-entry in Infinity Slots, players are notified of a timed-based Columbus Day sale with a mystery box (image 1).
- Players can purchase the first mystery box for \$0.99 (image 2).
- The mystery box, in this example, awarded \$11.09 in coins, \$2.74 in status points, and one scratch card (image 3).
- To play the scratch card, players click the 'scratch all' button or scratch with a coin (image 4).
- Each progressive mystery box purchase is more expensive. The prices increase from \$0.99 to \$2.99, to \$4.99, to \$6.99, and so on (image 5).
- By purchasing additional mystery boxes, players are able to add to their collection of sailboats, receiving an additional mystery box for each ten sailboats collected (image 6).



POLISH ITEMS

Increase conversion with an order progress bar. Provide a huge discount on a big win and inbox coupons to convert

- Provide a progress bar during the payment flow: During the iTunes payment process in Jackpotjoy Slots, a progress bar behind the iTunes dialogue box shows three steps to increase last-step conversion (image 1).
- Provide a ridiculous deal on a big win: After a big win in Classic Slots, players receive a \$19.99 offer that would multiply their big win (in this case 2,500 coins), and give them \$20 worth of coins and 1,000 VIP points (image 2).
- Test adding a text to the app-store icon: In Wizard of Oz, the iTunes icon says, '2,000,000 Free Credits' on it in very visible white and yellow letters. Upon entering the game, however, players do not receive credits—this is likely how the icon was approved by Apple (image 3).
- Market visitors' posts on the community page: Visitors may post administrator pre-approved messages on the community page to request friends (image 4).
- Test the concept of coupons added to inbox: In House of Fun, players are given coupons within their inbox (image 5). Clicking on the coupon takes the player to the buy page for a 60% discount on chips.
- Add alternative choice options to unlock new content: In Bingo Blitz, players can unlock with a direct purchase or by joining elite membership, using the alternative choice sales technique. Also review the May 2016 Report Out-of-Chips Flow (image 6).



PRODUCT MARKET WATCH AS OF 10/14/16

NOTABLE FEATURES OF 30 TOP GROSSING

A wide range of features were released from rewards, quests, and collections to boosts, leaderboards, and mini-games

Game	
Heart of Vegas	Rewards system (see detailed slide), and a feedback p
Slotomania	Quests and new boosts (see detailed slide). New playe
WSOP	Collection system based on cash hands that awards pla
Hit it Rich!	Entire game team system (see detailed slide) and Loya
Bingo Blitz	New bingo patterns, return of XP and level-unlocking c
Caesars Slots	Boosts, double your bet feature, delete unused machin
Bingo Bash	Wheel of Fortune IP added to bingo room
Wizard of Oz	Leaderboard, re-launched Vault, improvements to Bonu
myKONAMI	Bingo balls, a collection, timed-event added to the new
Scatter Slots	Re-released a skinned mini-game for Columbus Day (s
Infinity Slots	Leaderboard added and mystery box packages (see de
Slots Bonanza	Hidden packages (see Quick Wins)

Notable features released

panel inviting loyal players to provide feedback

er reward benefit, 'lotto bonus'

players WSOP bracelets (see detailed slide)

alty Lounge added, linking rewards across different Zynga games

content, final chapter of spooky trilogy, and Playtika rewards (see detailed slide)

nes (see Quick Wins), and coupons on purchases (see Polish Items)

nus Storm

vest machine, was recently released

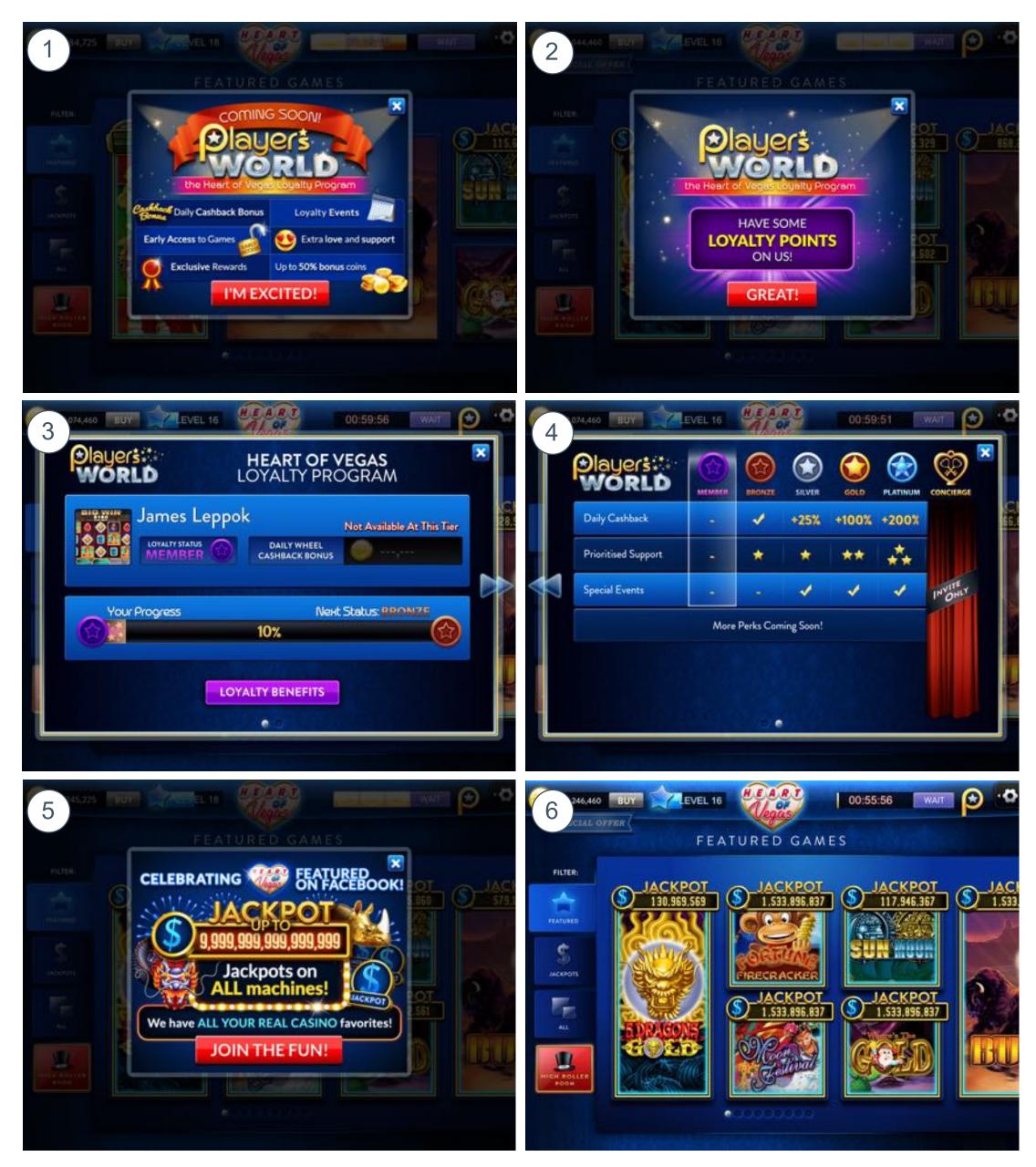
(see detailed slide)

letailed slide)

HEART OF VEGAS

Rewards program that provides daily cash back, better support, and special events. Progressive jackpots were also added to all machines

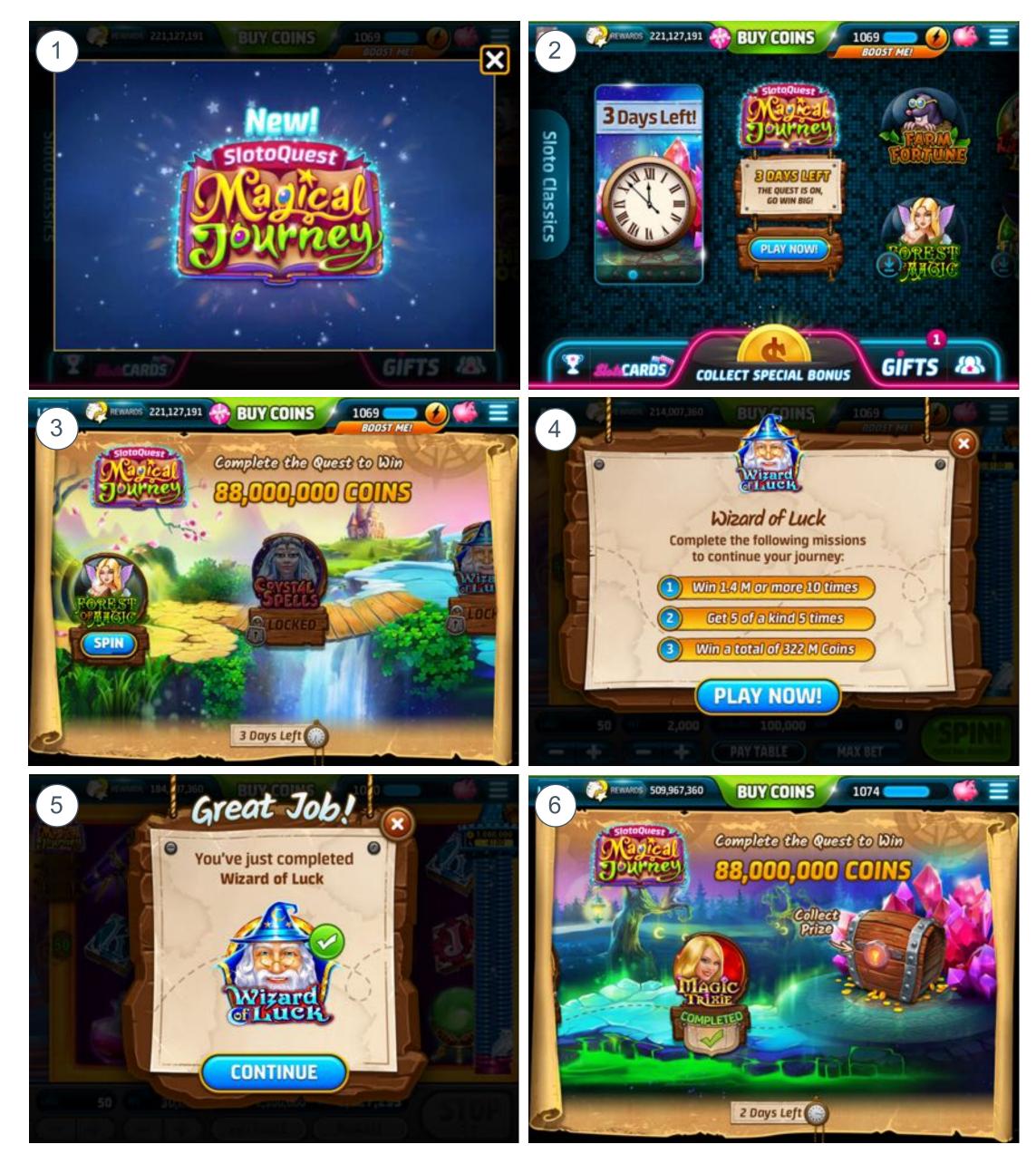
- The Player's World, as mentioned in the September 2016 Report, was marketed to players early. While all the planned features were included in the marketing, not all have been released (images 1 & 2).
- Players can find their rewards information in their profile (image 3).
- The Player's World is a loyalty program that currently offers three benefits for all tiers, except the Concierge, which is invite only (image 4). The cash back bonus provides players at certain levels with additional coins in the daily bonus.
- Progressive jackpots were temporarily added to all machines to celebrate a Facebook feature (images 5 & 6).
- Review the May 2016 Social Casino Product Report for additional information on Reward Programs and the February 2016 Social Casino Product Report for more details on progressive jackpots.



SLOTOMANIA

SlotoQuest: Magical Journey is a three-day event with multiple challenges tied to different machines

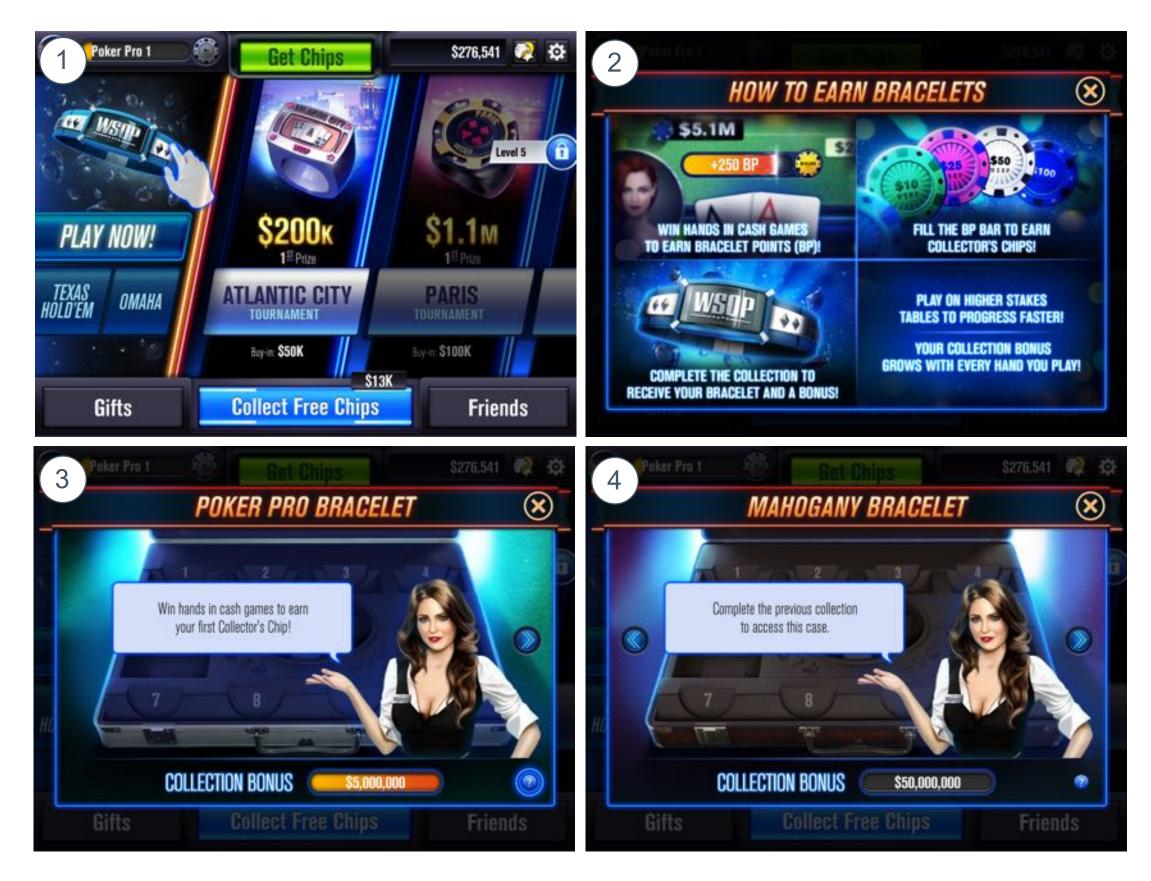
- Upon app-entry, a short video announces the newest feature SlotoQuest: Magical Journey (image 1).
- Players find the Magical Journey icon in the lobby. During game play, players are reminded of the time left to complete the quest to win big (image 2).
- Players travel along a path (or journey), playing various machines and completing missions to unlock the next stage (image 3).
- When entering a machine along the path, a dialog box appears explaining the mission necessary to continue the journey (image 4).
- Missions range from spinning 70 times on the first mission to spinning 68 free spins, hitting four mega wins, and winning 644 million coins for the final mission.
- When players complete a mission, a mission-complete dialogue box surfaces (image 5).
- Players who complete all the missions are awarded \$5,867 worth of coins, converted with a non-sale \$99.99 package (image 6).



WSOP

Released a collection system based on hands won in cash games leading to players eventually winning WSOP bracelets

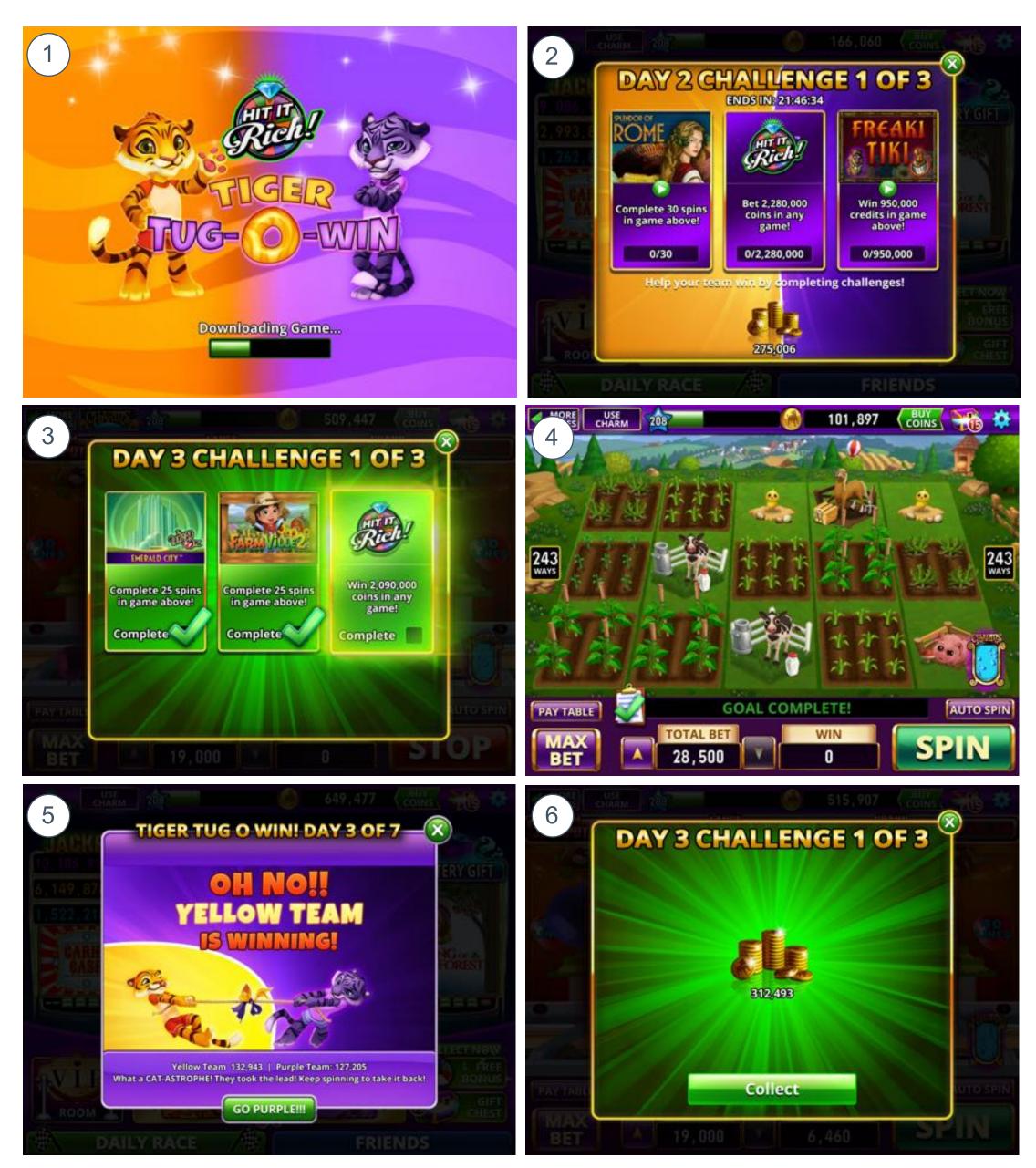
- In the lobby, a WSOP bracelet is marketed to players (image 1).
- Clicking on the bracelet takes the players to an explanation dialogue (image 2). Players win bracelets to progress along a series of collection mechanics:
 - 1. Win hands in cash games
 - 2. Fill up the bracelet points bar to earn collector's chips
 - 3. Use chips to complete collections
 - 4. Completed collections awards players with bracelets
- Collections are in the form of suitcases (image 3).
- Players may level-up their collections after completing prior collections (image 4).
- TV commercials are aired during the real world WSOP main event that include this feature.



HIT IT RICH!

Released a two-team, game wide competition based on challenges

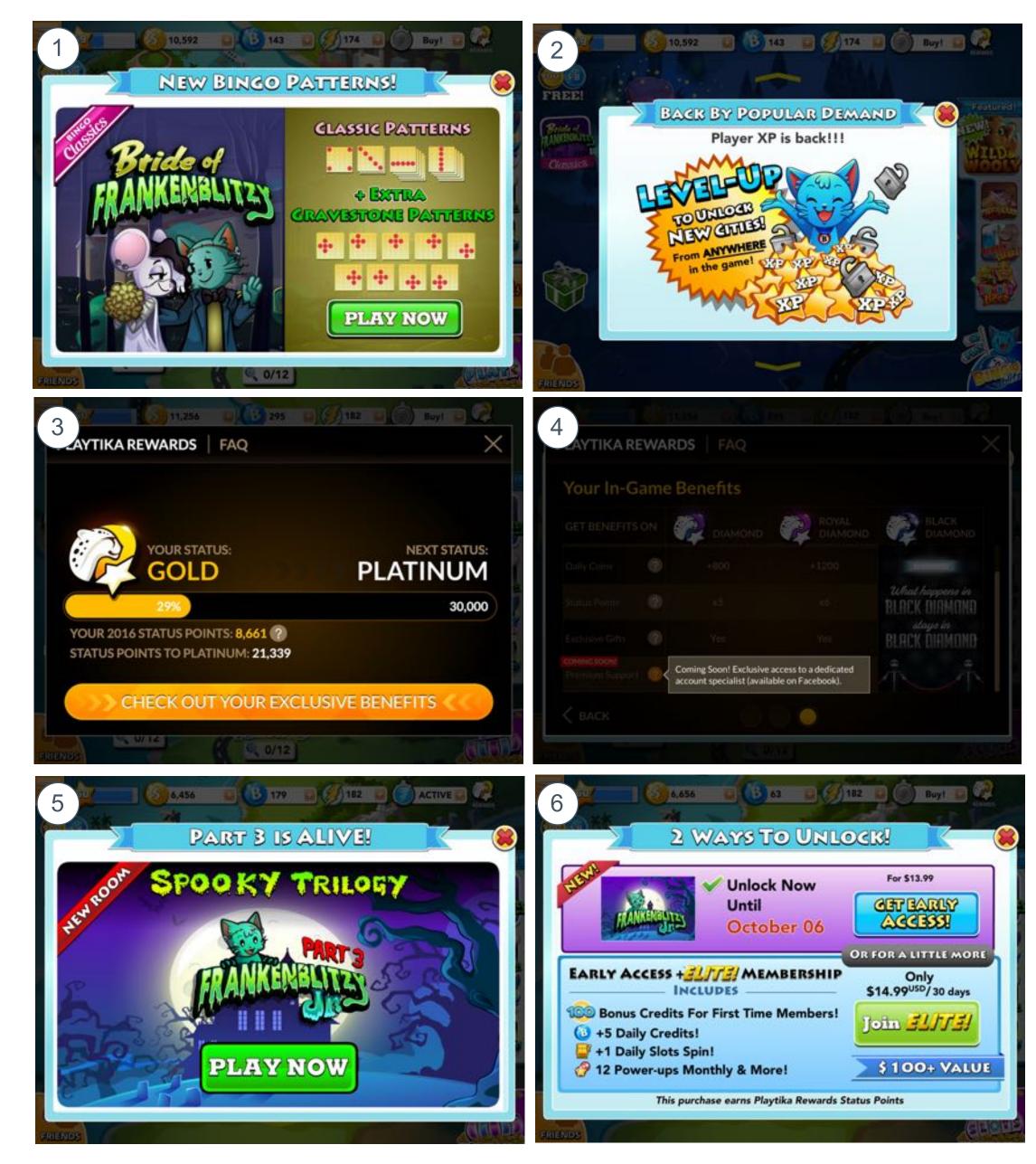
- Upon game-load, players are introduced to the Tiger Tug-O-Win feature, a two-team competition (image 1).
- Teams compete based on challenges completed (image 2).
- There are nine challenges daily that include spinning a certain machine, like the FarmVille 2 machine (images 3 and 4).
- During competition, players are updated daily on which team is currently winning (image 5).
- Completing the first challenge on day three rewarded players with ~\$0.90 worth of coins (image 6).
- Review the September 2016 Social Casino Product Report for details on clubs.



BINGO BLITZ

New bingo patterns, level and XP added back, Playtika rewards, and another chapter to the Spooky Trilogy released

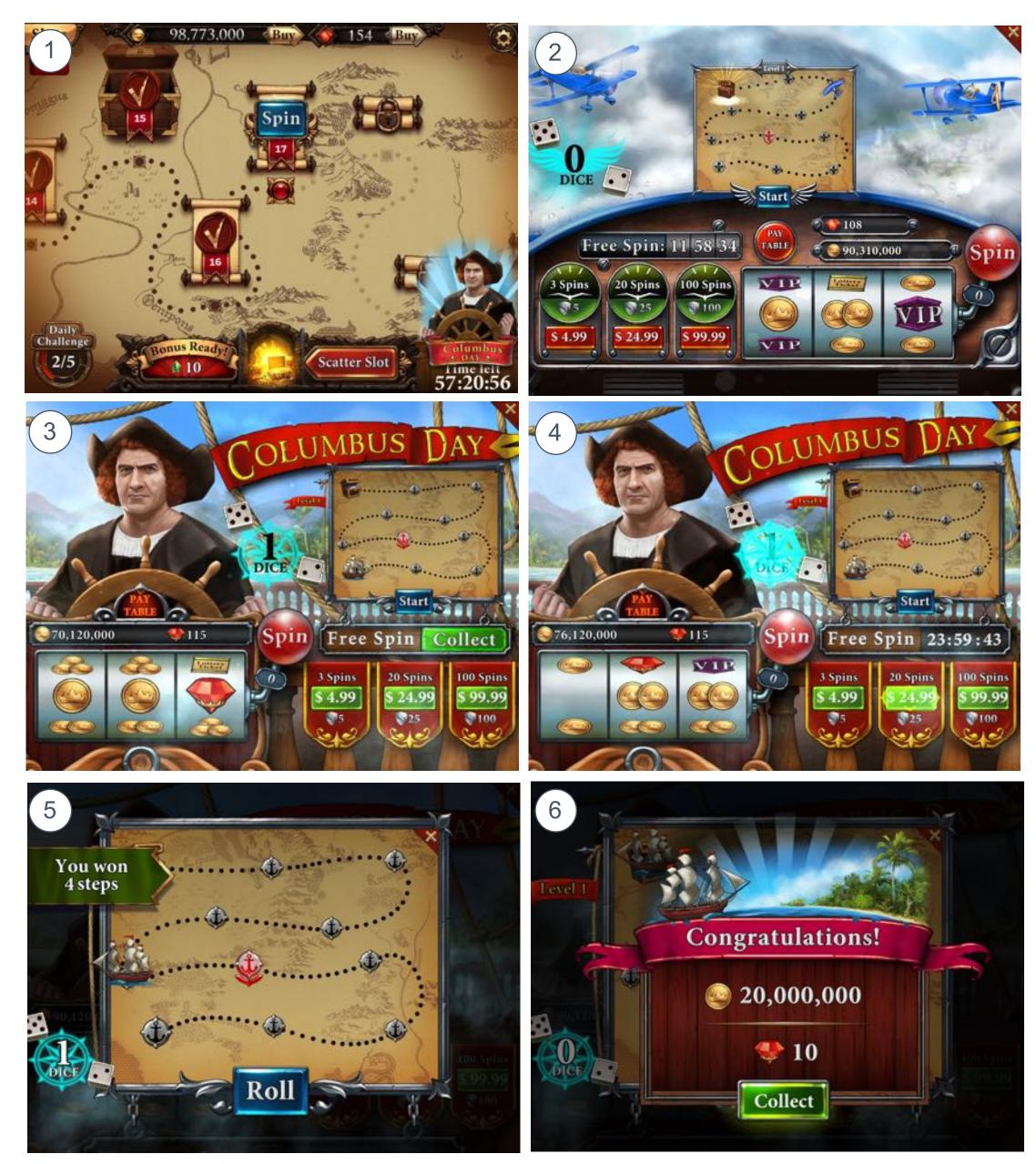
- Bingo Blitz offers more ways for players to win in the Bride of Frankenblitzy room with Gravestone patterns. Players can now bingo with the classic bingo pattern or a cluster of five that creates a cross anywhere on the bingo board (image 1).
- Bingo Blitz added back XP and leveling, offering players easier access to locked content. Players are now able to level up and unlock new game content from anywhere in the game, whether they are in bingo rooms or slot rooms (image 2).
- Playtika rewards offer players a variety of in-game rewards based on status level. The higher the player status, the higher the rewards on daily credits, daily coins, status points, and gifts (image 3).
- Royal Diamond and Black Diamond player levels can look forward to an upcoming feature of Playtika rewards, Premium Support. This benefit will give them exclusive access to a dedicated account specialist through Facebook (image 4).
- Part 3 of the Spooky Trilogy released Frankenblitzy Jr., as the final chapter in the Frankenblitzy-themed rooms (image 5).
- To enter and play in the room, players must purchase early access, or an elite membership (image 6).



SCATTER SLOTS

Scatter Slots released a re-skinned mini-game that includes a 3 x 3 machine for Columbus Day

- A mini-game is marketed on the map upon app-entry with a countdown timer (image 1).
- Scatter Slots released an earlier version of this mini-game for Aviation Day in August (image 2), and re-skinned it to celebrate Columbus Day (image 3).
- Players receive a free spin of the 3 x 3 machine by pressing collect and can win coins, VIP status, gems, and dice. The free spin is given out every 24 hours. Additional spins may be purchased for \$4.99 for three spins, \$24.99 for 20 spins, and \$99.99 for 100 spins (image 4).
- One free dice is given to players for the board game feature. To play the board game, players roll the dice to advance a ship along the map. Additional steps can be won by landing on the highlighted anchor along the way (image 5).
- Completing level one, by reaching the treasure chest, awards players \$7.56 worth of coins and \$2.50 in gems (image 6).
- Players then advance to level two, which has a similar map with the addition of more highlighted anchors.



INFINITY SLOTS

Infinity Slots added two new competition-based ranking systems for players to compete every week globally or with friends

- Players may link their game profile with Facebook accounts to invite friends and compete on the Friends Top Chart (image 1).
- Players are ranked based on the amount of coins won during each weekly session.
- After clicking the trophy icon in the main game lobby, players may view the Friends Top Chart to see what place they are in, as well as check the competition countdown timer (image 2).
- There is also a global competition with a weekly prize pool competition for the top 100 places. The leaderboard allows players to see their progress (up arrow) or descent (down arrow) (image 3).
- A pop-up surfaces in the top right corner of the machine alerting players whenever they achieve a new rank (image 4).



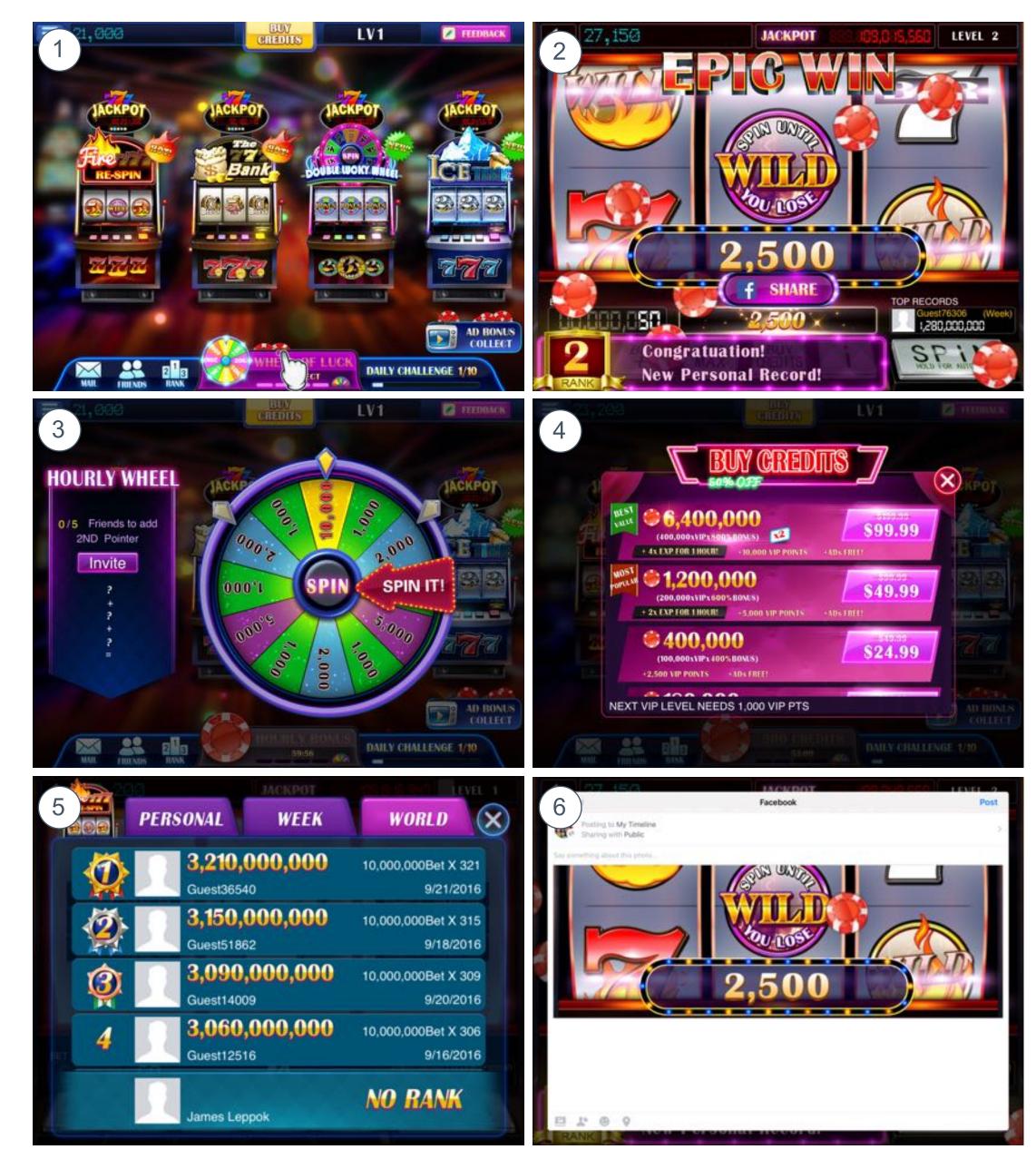
ECONOMY DEEP DIVE

Classic Slots

FEATURE SUMMARY

Classic Slots is filled with 59 classic machines, developed coin bonuses, and social features

- Only eight of the 59 classic machines are locked, starting at level 30 and ending at level 90 (image 1).
- All the machines are 3 x 3 machines with classic symbols including 7s, flames, 5x multipliers, etc. (image 2).
- There is a daily primary coin bonus and a secondary coin bonus, which is a wheel given out every hour (image 3).
- The buy page only shows three options—players must scroll down to see the other options (image 4).
- A leaderboard shows players their personal best, the best players that week, and the best players ever (image 5).
- There are several social features, including a mailbox, friend invites, and the ability to post big wins on Facebook (image 6).



ECONOMY SUMMARY

revenue, the coins-to-dollar ratio is very tight comparatively

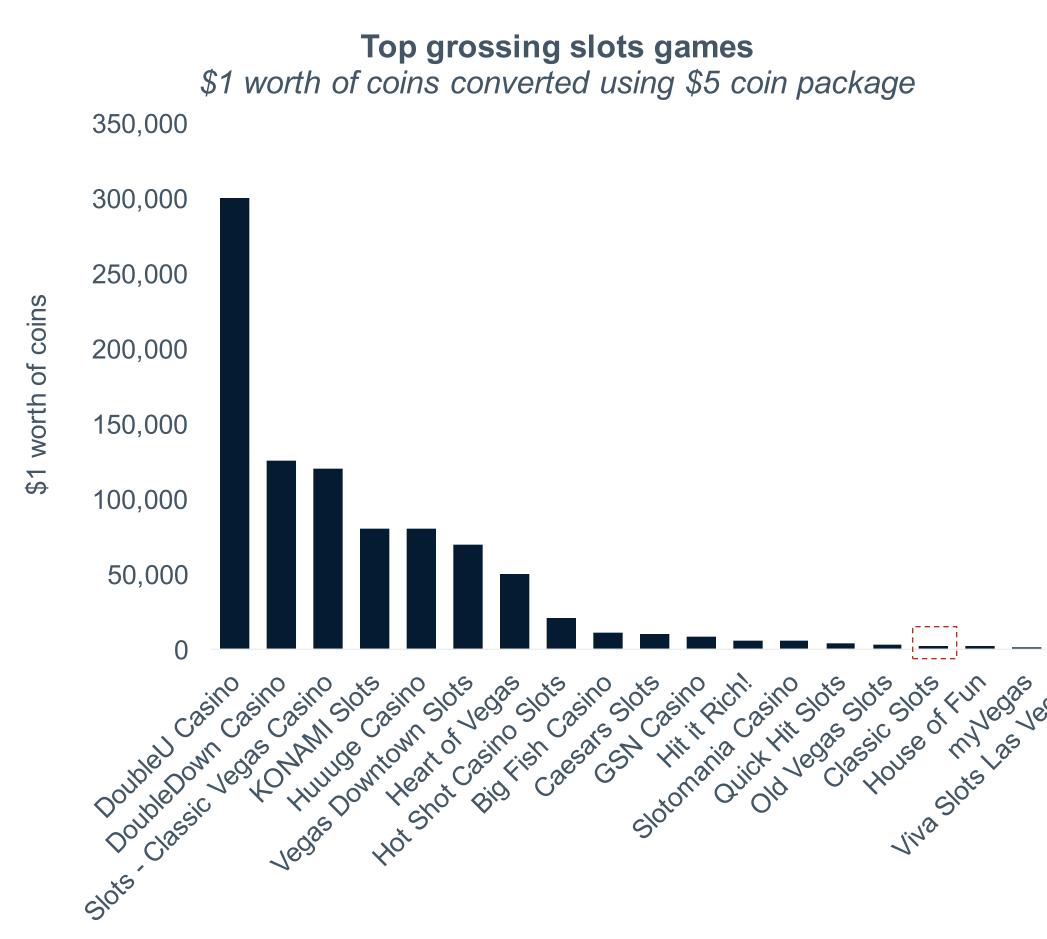
	Value	Tightness	
Coins-to-dollar ratio	2.5K		• Th
Initial coin balance	\$8.00		• Th ge
New user tuning	400 default spins		• Pla to
Total daily coin bonuses	\$5.80		• Pla cla

New users have unlocked machines and social features with a very loose new user tuning. To drive

Notes
he economy is tight compared to top grossing and classic slots games
he initial value players receive is average compared to top grossing but the most enerous compared to classic slots games
layers receive a relatively large number of spins at the default bet level compared to top grossing and the most compared to classic slots games
layers collect an average number of coins daily compared to top grossing and assic slots games

COINS-TO-DOLLAR RATIO

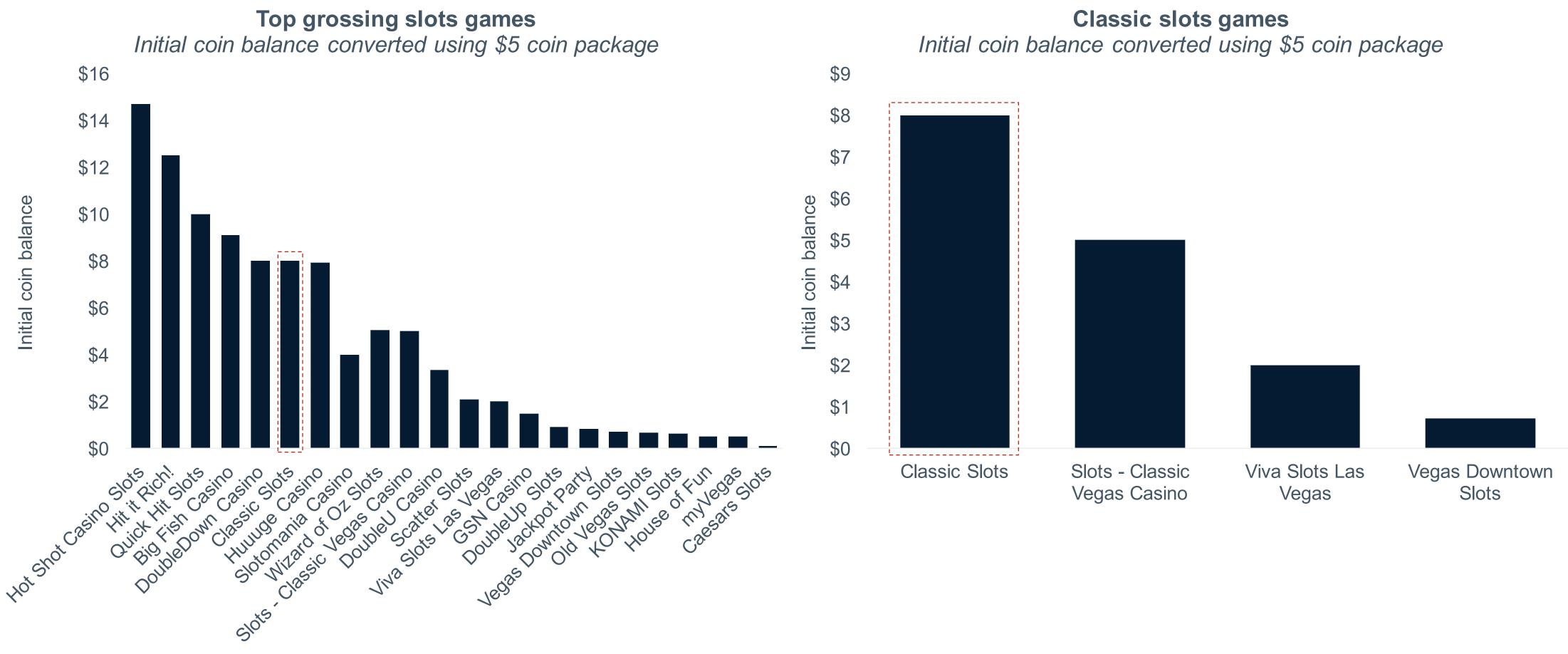
Classic Slots has a tight economy relative to the top 20 grossing slots games—a similar coin-to-dollar ratio to Old Vegas Slots and Viva Slots Las Vegas





INITIAL COIN BALANCE

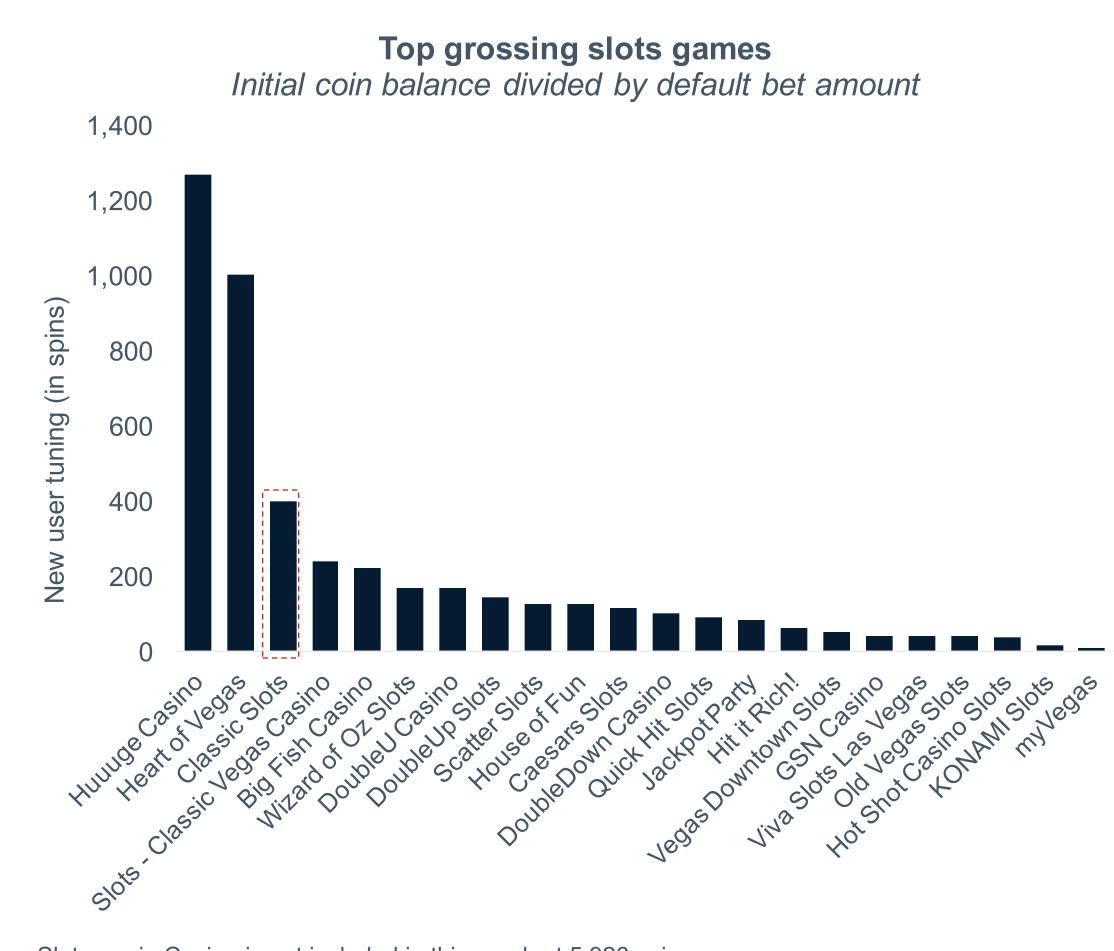
Classic Slots gives a slightly above average amount of initial coins compared to top grossing games, which lack as many social features



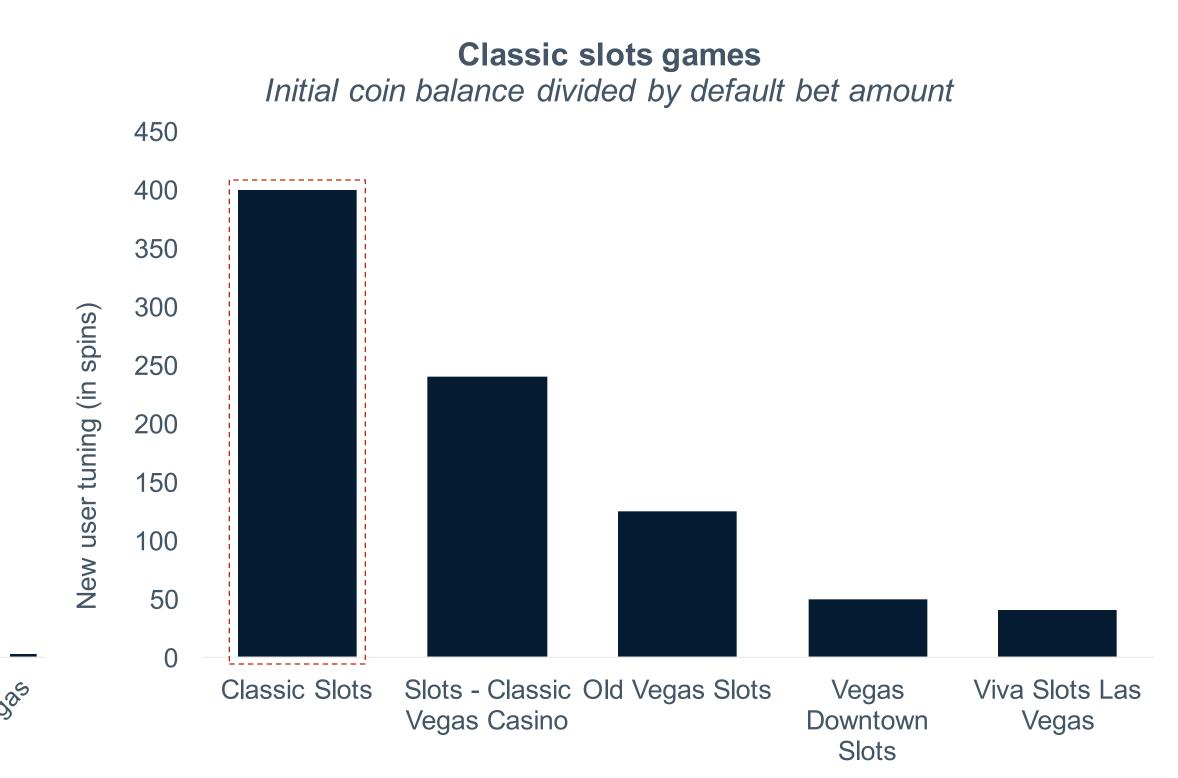
games—likely due to social features. Classic Slots also gives out more compared to classic slots

NEW USER TUNING

Classic Slots' new user tuning is very loose, with 4,000 spins for the default bet—the most spins compared to classic slots games

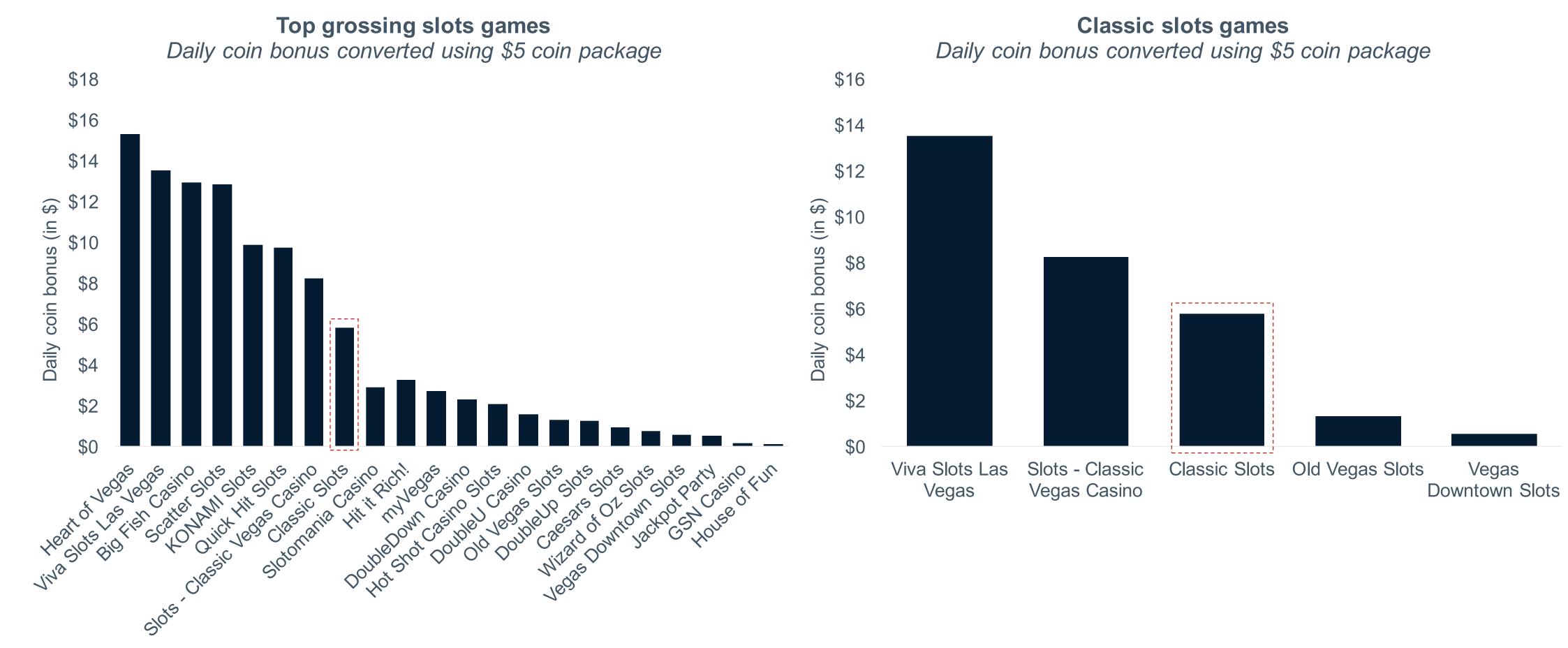


Slotomania Casino is not included in this graph at 5,926 spins



TOTAL VALUE OF COIN BONUSES

Initially, Classic Slots provides an average amount of coin value daily compared to both top grossing and classic slots games

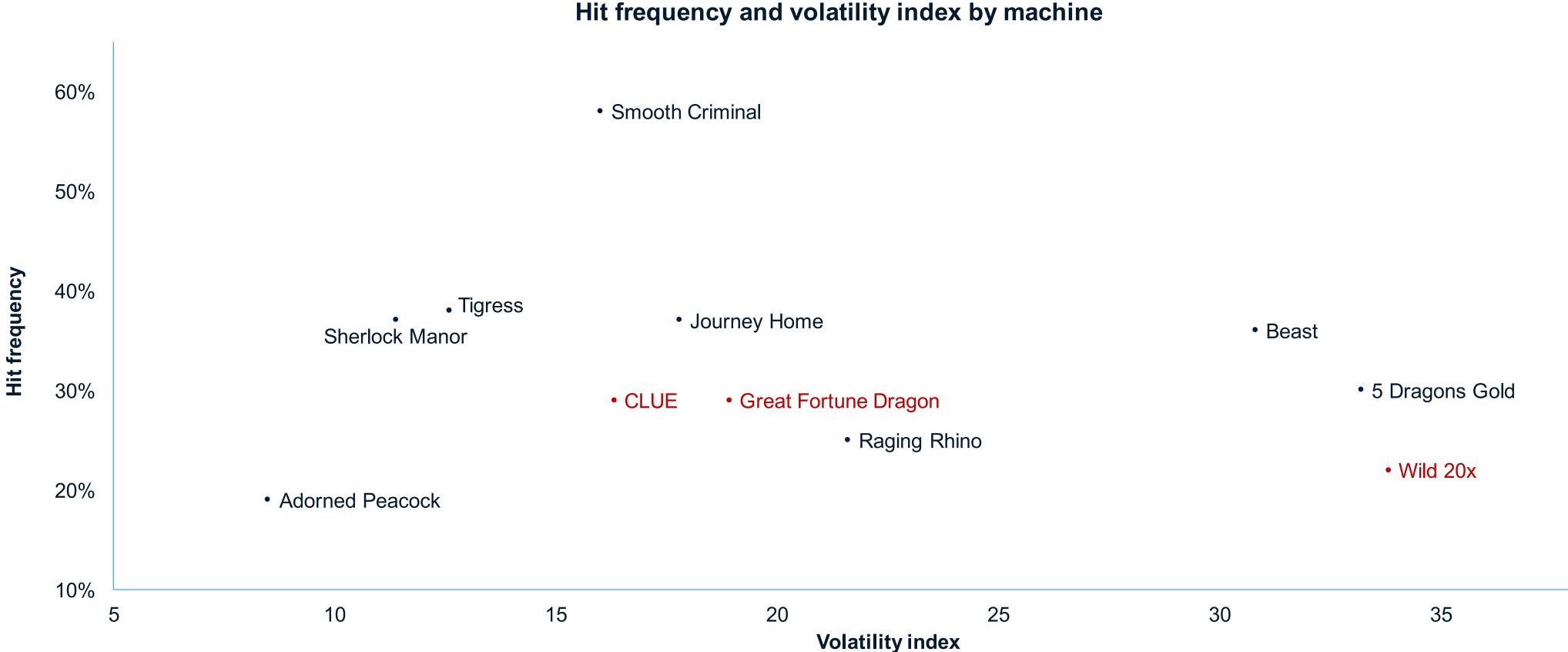


NEW MACHINE RELEASES

• Great Fortune Dragon from House of Fun • WILD 20x from Viva Slots Las Vegas CLUE from Hot Shot Casino Slots

SLOT MACHINE OVERVIEW

volatility indexes. Wild 20x, as expected, produced a high volatility index and below average hit frequency*



*Observations based on 1,000 spins—details on calculations and process in Appendix



Great Fortune Dragon and CLUE produced slightly below average hit frequencies with moderate

40

HOUSE OF FUN

29%	Hit frequency The hit frequency was 29% after 1,000 spins. This includes bor game wins, which was 0.4% of total wins
19	Volatility index The VI is based upon the standard deviation of 1,000 spins with 90% confidence level*
58% - 95%	RTP range with 90% confidence level The median payout was 77% after 1,000 spins*

Mechanics:

- This machine offers stacked wilds, free spin bonuses, and a Great Fortune Dragon feature.
- Players can trigger up to 20 free games by three or more golden scatter symbols anywhere on the reels (images 1 and 2).
- During play, the Great Fortune Dragon adds extra wild symbols to the reels (images 3 and 4).

Great Fortune Dragon session produced an average hit frequency, average volatility index, and an RTP range between 58% and 95% with a 90% confidence level. 16% of RTP came from the bonus game



^{*}Details on this process are in the Appendix

VIVA SLOTS LAS VEGAS

WILD 20x session produced a below average hit frequency, high volatility index, and an RTP range between 56% and 123% with a 90% confidence level. There was no bonus game RTP

22%	Hit frequency The hit frequency was 22% after 1,000 spins. There was no bonus game RTP for this game
34	Volatility index The VI is based upon the standard deviation of 1,000 spins with 90% confidence level*
56% - 123%	RTP range with 90% confidence level The median payout was 89% after 1,000 spins*

Mechanics:

- A classic style machine that offers five paylines and multiplying wilds of 2x, 3x, 4x, and 20x (image 1).
- If more than one multiplying wild lands on a payline, all wins are multiplied by all wilds (images 2 and 3).
- Wilds that land on a payline, without a win set, will win half the bet (image 4).



^{*}Details on this process are in the Appendix

HOT SHOT CASINO SLOTS

99% and 131% with a 90% confidence level. 52% of RTP came from the bonus game

29%	Hit frequency The hit frequency was 29% after 1,000 spins. 15% of spins we bonus game wins
16	Volatility index The VI is based upon the standard deviation of 1,000 spins wit 90% confidence level*
99% - 131%	RTP range with 90% confidence level The median payout was 115% after 1,000 spins*

Mechanics:

- This machine offers players stacked wilds, a free spins bonus, a pick bonus, and an additional room feature. The free spins bonus is triggered when three matching bonus symbols land on reels one, three, and five (image 1).
- The detective pick bonus can be triggered by three matching symbols appearing on reels one, two, and three (image 2).
- The room feature is triggered when room symbols appear on the main reel set (image 3).
- Players are awarded one spin in that room (image 4).



CLUE session produced an average hit frequency, average volatility index, and an RTP range between





APPENDIX

DATA COLLECTION PROCESS

Machine observations are from 1,000 spins and an RMG-process to determine 90% confidence levels of a machine's play. Recommendations, information, and data comes from market research, app intelligence tools, and deep analysis of the games

Machine information

- The volatility index (VI) is based upon the standard deviation of the spins, with a 90% confidence level.
- The machines are spun 1,000 times.
- The median output and standard deviation of the 1,000 spins are determined.
- The standard deviation is then multiplied by 3.16 to find the VI, which is one deviation from the median.
- The VI is then added and subtracted from the median to find the RTP range with a 90% confidence.
- For example, if after 1,000 spins the median output was .85 with a VI of 10, the RTP range would be 75% - 95% for 90% of games played for 1,000 spins.

- Each game is reviewed weekly for updates, regardless of whether the game has been updated through the App Store.
- Transaction information comes from the iOS App Store's In-App Purchases tab. These transactions are ranked based on the number of transactions.
- Las Vegas player insights come from online sources, such as the Las Vegas Convention and Visitors Authority and the UNLV Center for Gaming Research.
- Progressive jackpot information comes from online research, specifically from Wizard of Odds.
- Trending revenue, downloads, and package-rank data come from Priori Data, a Liquid and Grit partner.

Market research

Game information

- Game information comes from a deep-dive analysis of each game.
- In the economy section and economyrelated slides, the coin value is determined by converting coins into money using \$5 worth of non-sale purchasable coins in each game. For example, if the minimum bet is 1,000 coins and players can purchase 500 coins for \$5, the value of the minimum bet is \$10. For games without a \$5 package, the next closest package is used.
- The cost of each level is determined by how many coins are needed to complete it. Then, that amount is converted to a dollar amount using \$5 worth of non-sale purchasable coins, as mentioned above.

Armies will be united.

– Sun Tzu, *The Art of War*

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On encircled terrain it is appropriate to block up all the openings, showing the troops that there is no place to go. Then they will regard the army as their family; the multitude will be of one mind; and the strength of the Three

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