WHITEPAPER V1.0

FELINE DYNASTY

Complete documentation of the Feline Dynasty ecosystem — tokenomics, game mechanics, breeding genetics, DeFi systems, and economic sustainability on the TON blockchain.

19	3	14
CHAPTERS	TOKENS	LANGUAGES

TON
BLOCKCHAIN

Feline Dynasty — felinedynasty.com — @FelineDynastyBot
Version 1.0 • March 2026

Feline Dynasty — Whitepaper v1.0

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1. Executive Summary

Feline Dynasty is an idle breeding Play-to-Earn (P2E) game operating as a Telegram Mini App on the TON Blockchain. Players collect, breed, and evolve unique geometric cat NFTs, each producing in-game currency passively. The game features a triple-token economy designed for long-term sustainability, a comprehensive DeFi center, guild-based territory wars, and PvP arena battles.

Key Highlights: - 5 NFT rarity tiers with increasing production rates - 20-level habitat progression system with cosmetic rewards - Multi-tier DeFi staking with dynamic APY - Multi-level referral commission structure - 14 languages supported natively - Multi-oracle pricing system for reliable market data - Automated + manual withdrawal system with treasury protection

2. Architecture Overview

2.1 Technical Stack

LAYER	TECHNOLOGY
Frontend	React + TypeScript, Tailwind CSS, Shadcn UI
Backend	Express.js + TypeScript (Cloudflare Functions)
Database	PostgreSQL (Neon) with Drizzle ORM
Blockchain	TON (The Open Network)
Hosting	Cloudflare Pages + Functions + KV
Connection Pooling	Cloudflare Hyperdrive

LAYER	TECHNOLOGY
Wallet Integration	TON Connect with cryptographic proof verification
Real-time	WebSocket with polling fallback

2.2 Infrastructure

The system is deployed on Cloudflare's global edge network, ensuring low latency worldwide. The database uses Neon's serverless PostgreSQL with connection pooling through Cloudflare Hyperdrive for optimal performance under load.

Smart contracts are deployed on the TON blockchain using FunC, handling deposit/withdrawal operations with multi-signature security.

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3. Triple-Token Economy

Feline Dynasty operates on a triple-token model designed to separate utility, premium, and withdrawable value.

3.1 Token Definitions

TOKEN	SYMBOL	TYPE	PURPOSE
Essenza Felina	EF	Utility	Passive cat production, upgrades, in-game purchases
Feline Token	FTON	Premium	Cat purchases, marketplace, premium features

TOKEN	SYMBOL	TYPE	PURPOSE
Feline Gold	FGOLD	Withdrawable	Staking, withdrawal to TON, premium operations

3.2 Token Flow

```
Cat Production ⟶ EF (passive hourly)
    |
    v
EF Conversion ⟶ FTON + FGOLD
    |               |
    v               v
Marketplace     Withdrawal (TON)
Cosmetics       Staking
Upgrades        Burning
```

3.3 Conversion Mechanics

EF can be converted to FTON and FGOLD through the in-game exchange system. Conversion rates are dynamically adjusted based on ecosystem health.

Dynamic FGOLD Allocation Formula:

$$\text{FGOLD\_Share}(t) = \alpha(t) * \text{EF\_converted}$$

where $\alpha(t) = f(\text{Active\_Users}, \text{Treasury\_Health})$

$\alpha \in [\alpha_{min}, \alpha_{max}]$, monotonically increasing with user base

The proportion of FGOLD in each conversion scales with the active user base through a tiered allocation function, preventing early exploitation while rewarding ecosystem growth.

3.4 Fee Structure

All operations carry platform fees that serve as economic sinks:

```
Net_Revenue = Σ(Transaction_i * Fee_Rate_i) for i ∈ {deposits, withdrawals, marketpla

Token_Equilibrium condition:
  Total_Sinks ≥ Total_Emissions * (1 + Safety_Margin)
```

Fee rates are calibrated dynamically to maintain healthy treasury reserves while remaining competitive.

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4. NFT Cat System

4.1 Rarity Tiers

Each NFT cat produces Essenza Felina (EF) passively every hour. Five rarity tiers exist, each with increasing production output:

RARITY	CAT TYPE	DESCRIPTION
Common	Kitten	Entry-level, accessible to all players
Uncommon	Hunter	Enhanced production, breeding potential
Rare	Guardian	Significant output, genetic diversity
Epic	Emperor	High-value producer, rare genetics
Legendary	Divine	Maximum production, premium genetics

Higher-rarity cats produce exponentially more EF per hour, creating a clear progression incentive.

4.2 Production Formula

The effective production for each cat is computed through a multi-factor model:

```
P_eff(cat) = R_base(rarity) * M_habitat(level) * (1 + B_genetics) * (1 + B_achievemer

where:
  R_base     = base production rate (tier-specific constant, EF/h)
  M_habitat  = habitat multiplier function, M: [1..20] → [1.0, M_max]
  B_genetics = Σ(trait_bonus_i) for i ∈ {eye, fur, body, ear, tail, pattern}
  B_achievement = Σ(milestone_bonus_j) for completed achievements j
  A_ability  = special ability multiplier ≥ 1.0
```

This multi-layered system rewards players who invest in habitat upgrades, selective breeding, and milestone achievements. The compounding nature of these multipliers creates exponential value differentiation between optimized and unoptimized cats.

4.3 Accumulation System

Cats accumulate EF up to a dynamic capacity limit:

```
Cap(level) = C_base + (level * C_increment)
Overflow_Zone = Cap * κ, where κ > 1

Production_Rate = {
  P_eff           if accumulated < Cap
  P_eff * δ       if Cap ≤ accumulated < Overflow_Zone    (δ < 1)
  0               if accumulated ≥ Overflow_Zone
}
```

This mechanism incentivizes regular claiming and active participation while preventing indefinite AFK accumulation.

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5. Habitat System

The habitat is a 20-level progression system that directly impacts EF production through multiplier bonuses.

5.1 Overview

Players upgrade their habitat through 20 unique levels, from “Basic Shelter” to “Genesis”. Each level provides: - Increased production multiplier (up to several hundred percent) - Higher accumulation capacity - Unique themed environments - Endgame cosmetic rewards (Levels 11-20)

Habitat Multiplier Growth:

```
M_habitat(n) = 1 + Σ(Δ_i) for i = 2..n

where Δ_i follows a diminishing returns curve:
  Δ_i = Δ_base * (1 - e^(-λ*i)) / i^γ

  Δ_base = initial increment factor
  λ      = growth rate parameter
  γ      = diminishing returns exponent

Upgrade_Cost(n) = C_1 * n^β * e^(μ*n)
  (exponential-polynomial hybrid ensuring late-game scarcity)
```

5.2 Endgame Cosmetic Rewards

Levels 11 through 20 unlock exclusive cosmetic items: - **Badges** for display on player profiles - **Auras** as visual effects around cats - **Frames** for profile customization - **Backgrounds** and **Pedestals** for habitat decoration

5.3 Milestone Cat Rewards

Reaching specific habitat milestones awards free cats of increasing rarity, providing a significant progression boost without additional investment.

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6. Breeding & Genetics

6.1 Breeding Mechanics

Breeding combines two parent cats to produce an offspring with inherited traits.

Offspring Rarity Determination:

```
R_offspring = floor((R_parent1 + R_parent2) / 2) + Mutation(p)

where Mutation(p) = {
  +1    with probability p_mutation
   0    with probability (1 - p_mutation)
}

p_mutation = p_base + (generation * Δ_gen)
  p_base = base mutation probability
  Δ_gen  = per-generation mutation bonus
```

Key aspects: - FGOLD cost per breeding attempt - Cooldown period between breeding sessions - Mutation chance for rarity upgrades, increasing with generation depth

6.2 Advanced Genetics System

The game implements a Mendelian inheritance model with 7 trait categories:

1. Eye Color
2. Fur Pattern
3. Fur Color
4. Body Shape
5. Ear Type
6. Tail Type
7. Special Ability

Each gene has dominant and recessive alleles inherited from both parents with weighted probabilities.

Allele Inheritance Model:

```
For each trait T:
  Allele_pool = {P1_dom(w₁), P1_rec(w₂), P2_dom(w₃), P2_rec(w₄)}
  where w₁ + w₂ + w₃ + w₄ = 1.0
```

```
  Selected_allele = weighted_random(Allele_pool)

  if random() < p_mutation(generation):
    Selected_allele = mutate(Selected_allele, direction)
    direction ∈ {upgrade, downgrade} with respective probabilities
```

6.3 Genetic Production Bonuses

Trait rarities provide additive EF production bonuses, while Special Abilities apply multiplicative bonuses:

```
B_genetics_total = Σ(TRAIT_BONUS[rarity(trait_i)]) for i ∈ all_traits
P_final = P_base * (1 + B_genetics_total) * ABILITY_MULTIPLIER[ability_type]
```

This makes genetically superior cats significantly more productive, driving demand for strategic breeding.

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7. Fusion Lab

The Fusion Lab allows players to combine multiple cats of identical type and rarity to create a higher-rarity cat.

7.1 Overview

- Requires N cats of the same type and rarity
- FGOLD cost per fusion attempt
- Probabilistic outcome (not guaranteed success)
- On failure: partial cat loss with consolation bonus for survivor

Fusion Probability Model:

```
P(success) = P_base * Quality_Factor(input_cats)

On Success:  Output = Cat(rarity + 1, random_genetics(rarity + 1))
On Failure:  Lost = N - 1 cats
```

```
                Survivor receives permanent +o% production bonus

  Expected_Cats_for_Legendary = N^(levels) / P_base^(levels)
    where levels = number of rarity tiers to traverse
```

7.2 Rarity Progression

```
  Common --[P_base]--> Uncommon --[P_base]--> Rare --[P_base]--> Epic --[P_base]--> Leg
```

The exponential difficulty of creating Legendary cats through fusion (requiring N^4 Commons statistically) ensures their extreme rarity and value in the ecosystem.

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8. Cat Synth Lab

The Synth Lab is a guild-collaborative crafting system for advanced cat modifications.

8.1 Available Recipes

Multiple synthesis recipes are available, including: - **Production Enhancement** - Boost cat output - **Rarity Enhancement** - Chance to upgrade rarity - **Trait Fusion** - Combine best genetic traits from multiple cats

8.2 Guild Collaboration

Guild members can collaborate on synthesis projects, receiving bonuses to success rates and cost reductions based on guild level. This encourages social gameplay and guild participation.

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9. DeFi Center

The DeFi Center provides three financial instruments for advanced players.

9.1 FGOLD Staking (Dynamic APY)

Players lock FGOLD for fixed periods to earn yield across multiple tiers.

Dynamic APY Formula:

```
APY_actual(tier, t) = APY_base(tier) * H(t)

where H(t) = Treasury Health Multiplier:
  H(t) = {
    1.0                        if Reserve_Ratio > θ_healthy
    (Reserve_Ratio - θ_critical) / (θ_healthy - θ_critical)
                               if θ_critical < Reserve_Ratio ≤ θ_healthy
    H_min                      if Reserve_Ratio ≤ θ_critical
  }

  Reserve_Ratio = Treasury_Balance / Total_Liability

Safety Constraint:
  TVL_staking ≤ τ_hard * Treasury_Total
  (new stakes blocked if TVL > τ_emergency * Treasury_Total)
```

9.2 Mining (Emission Control)

Players commit FTON liquidity to earn EF with lock-period multipliers:

```
EF_daily(user) = FTON_committed * R_base * M_lock(duration)

where M_lock: {d₁, d₂, d₃, d₄} → {m₁, m₂, m₃, m₄}  (increasing multipliers)

Global Emission Cap:
  Σ(EF_daily(all_miners)) ≤ Total_EF_Supply * ε_daily
  (prevents inflation by bounding total daily mining output)
```

9.3 NFT Lending

Players use NFT cats as collateral to borrow FTON:

```
Loan_Amount(cat) = Collateral_Value(rarity) * LTV_ratio

where LTV_ratio < LTV_max (liquidation threshold)

Interest = Principal * r_flat (fixed rate, fixed term)

Liquidation triggered if:
  - LTV exceeds LTV_max, OR
  - Loan term expires without repayment
  → NFT transferred to lending pool
```

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10. Arena PvP System

10.1 ELO Rating System

Rating Adjustment Formula:

```
R_new = R_current + K * (S - E)

where:
  K = adjustment constant (asymmetric: K_win > K_loss)
  S = actual outcome (1 = win, 0 = loss)
  E = expected outcome = 1 / (1 + 10^((R_opponent - R_current) / 400))

Matchmaking constraint:
  |R_player - R_opponent| ≤ Δ_max
```

10.2 Battle Rewards

Victories earn EF, experience points, and a chance for equipment drops:

```
Equipment_Drop = Bernoulli(p_drop)

Rarity_Distribution = Categorical(p_common, p_uncommon, p_rare, p_epic, p_legendary)
  where Σ(p_i) = 1.0 and p_i decreases with rarity
```

```
Stat_Bonus(slot, rarity) = f(fighter_level, rarity_tier)
  for slot ∈ {weapon, armor, helmet, accessory}
```

10.3 Fighter Progression

Fighters gain XP and level up through battles. An energy system ensures balanced daily participation:

```
XP_gain = XP_base * outcome_multiplier
Level_up condition: XP_accumulated ≥ XP_threshold(current_level)
Energy_recharge: min(E_max, E_current + E_regen * Δt)
```

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11. Guild System & Wars

11.1 Guild Wars

Seasonal territory conquest between guilds with economic implications:

```
Territory_Value(t) = Base_Bonus * Decay_Function(t)

Decay_Function(t) = {
  1.0                                    if t_inactive ≤ T_grace
  max(D_min, 1.0 - ρ * (t_inactive - T_grace))   if t_inactive > T_grace
}

Attack_Power = Σ(EF_contributed_by_members) / η
  where η = EF-to-Attack conversion ratio
```

Multiple unique territories provide production bonuses to the controlling guild. Territories require active defense or they decay over time.

11.2 Dual Treasury Architecture

TREASURY	PURPOSE
Game Treasury	Player deposits/withdrawals
Guild Treasury	Guild operations, war funding

Each treasury operates independently with its own balance tracking, ensuring clean separation between personal and guild finances.

11.3 Guild Customization

Guilds can purchase cosmetic items including banners, animated themes, and premium emblems using guild funds.

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12. Engagement Systems

12.1 Daily Roulette

Weighted prize wheel with various rewards including tokens and rare cats. Spins are acquired through purchases or watching promotional content.

12.2 Daily Streak

Consecutive login rewards escalate over weekly cycles, rewarding consistent daily engagement with increasing token amounts.

12.3 Treasure Hunt

A 30-day progressive reward cycle with daily claims, milestone bonuses, and a premium end-of-cycle reward. Encourages long-term retention.

12.4 Mission System

Social and partner missions reward players for community engagement, including joining social channels, following on social media, and cross-promotional activities

with TON ecosystem partners.

12.5 Achievement System

Milestone-based permanent bonuses for collection goals, referral targets, and gameplay milestones. Achievements provide lasting EF production boosts.

12.6 Competition System

Periodic global leaderboard events with prize pools funded by the treasury. Top performers receive significant FGOLD rewards.

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13. Marketplace & Auctions

13.1 P2P Marketplace

Direct cat trading between players with platform fees on sales. Prices set by sellers in FTON.

13.2 Auction System

Time-limited bidding with minimum bid increments. Anti-wash-trading detection prevents market manipulation through behavioral analysis.

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14. Referral Program

14.1 Multi-Level Commission Structure

A multi-level referral system distributes commissions across several tiers of referrers. Direct referrals earn the highest percentage, with decreasing rates for deeper levels.

Anti-abuse protections include: - Circular referral loop detection - Self-farming prevention through device analysis - Minimum distribution thresholds to prevent micro-spam

Link Format: `t.me/FelineDynastyBot/play?startapp=CODE`

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15. Treasury & Blockchain Integration

15.1 Smart Contract

Deployed on TON mainnet as FunC smart contracts handling: - Deposit reception with automatic fee deduction - Withdrawal execution with cryptographic signature verification - Emergency pause/resume functionality - Dual treasury address support (Game + Guild)

15.2 Multi-Oracle Pricing System

A 5-oracle cascade provides real-time TON/USD pricing without relying on a single data source. If the primary oracle fails, the system cascades through alternatives, ensuring near-perfect price availability.

15.3 Deposit System

Deposits support both native TON and USDT Jetton transfers. Transactions are verified on-chain before credits are applied to user accounts.

15.4 Withdrawal System

Withdrawals below a defined threshold are processed automatically. Larger withdrawals require manual admin approval to protect the treasury. A lifetime withdrawal cap limits total withdrawals relative to deposits.

15.5 Deposit Auto-Recovery

A recovery system handles edge cases where deposits are not credited due to network issues. Users can trigger a blockchain scan to locate and credit missing

transactions.

15.6 Treasury Protection

An absolute floor mechanism blocks all withdrawals when treasury reserves fall below a critical threshold, protecting the ecosystem during extreme market conditions.

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16. Security Architecture

16.1 Authentication Layers

1. **Telegram initData Validation** — Cryptographic verification of Telegram WebApp data with expiry protection
2. **Session Tokens** — Signed tokens with timing-safe comparison to prevent attacks
3. **Wallet Proof Verification** — Cryptographic signature validation of wallet ownership

16.2 Anti-Abuse System

DETECTION	METHOD
Multi-Account	Device fingerprinting + behavioral analysis
Bot Detection	Timing pattern analysis, speed anomaly detection
Wash Trading	Buyer/seller correlation analysis
Referral Abuse	Loop detection, self-farming prevention
Exploit Detection	Rate anomaly detection on economic operations

16.3 Rate Limiting

Tiered rate limiting protects all API endpoints, with stricter limits on sensitive operations (authentication, wallet, withdrawals).

16.4 Infrastructure Security

- Content Security Policy (CSP) with strict source whitelisting
- Web Application Firewall (WAF)
- HSTS and X-Content-Type-Options headers
- Withdrawal review queue with full audit trail

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17. Economic Sustainability Model

17.1 Inflation Control

The economic model is governed by a multi-variable control system:

```
dS/dt = Emissions(t) - Sinks(t) - Burns(t)

where:
  Emissions(t) = Mining_Output(t) + Staking_Rewards(t) + Game_Rewards(t)
  Sinks(t)     = Σ(Fee_i * Volume_i) for all fee-bearing operations
  Burns(t)     = Breeding_Burns + Fusion_Burns + Synth_Burns + Cosmetic_Burns

Stability condition: dS/dt ≤ 0 (net deflationary or neutral)
```

Key inflation control mechanisms: - Dynamic conversion rates: α(t) scales with user base - Daily emission cap: Emissions ≤ ε * Total_Supply - Treasury health-dependent yields: APY(t) = f(H(t)) - Lifetime withdrawal cap: W_max = λ * Total_Deposited - Multiple FGOLD burn mechanisms across all gameplay systems

17.2 Treasury Health System

Treasury health is continuously monitored through a reserve ratio model:

```
H(t) = Treasury_Balance(t) / Total_Liability(t)

Adaptive Response Function:
  APY_multiplier    = g₁(H)     ∈ [H_min_mult, 1.0]
  Emission_rate     = g₂(H)     ∈ [ε_min, ε_max]
  Fee_multiplier    = g₃(H)     ∈ [1.0, F_max]
  Withdrawal_speed  = g₄(H)     ∈ [0, W_max_daily]

  where g₁, g₂ are monotonically increasing with H
  and   g₃ is monotonically decreasing with H

Emergency Protocol:
  if H(t) < θ_floor:
    Withdrawal_speed = 0  (absolute floor protection)
```

This self-regulating feedback loop ensures the economy adapts to market conditions without manual intervention.

17.3 Revenue Streams (Token Sinks)

```
Total_Revenue = Σ(Volume_i * r_i)

where i ∈ {
  deposits, withdrawals, marketplace, auctions,
  breeding, fusion, synthesis, cosmetics,
  guild_operations, founder_fees
}

Sustainability_Ratio = Total_Revenue / Total_Emissions
Target: Sustainability_Ratio ≥ 1.0 + Safety_Margin
```

This diversified sink structure ensures consistent token absorption across all gameplay activities, maintaining long-term economic equilibrium.

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18. Roadmap

Phase 1: Launch & Core (Completed)

- Triple-Token Economy
- NFT Cats & 20-Level Habitat System
- Breeding + Fusion Lab + Advanced Genetics
- DeFi Center (Staking, Mining, NFT Lending)
- Arena PvP with Rating System
- Marketplace & Auctions
- 14-Language Support

Phase 2: Growth (Completed)

- Advanced Security Implementation
- Cosmetics Shop
- Achievement System
- Landing Page
- Daily Streak & Treasure Hunt

Phase 3: Expansion (In Progress)

- Guild Wars & Territory Control
- NFT On-Chain Minting
- Competition System & Leagues
- Cat Synth Lab (Completed)
- Partner Games

Phase 4: Dynasty Universe (Future)

- 2D PC Adventure Game
- Cross-Platform Sync
- Multi-Level World with NPCs
- NFT Cats as in-game companions

19. Conclusion

Feline Dynasty represents a new paradigm in blockchain gaming: a sustainable, community-driven economy built on the TON blockchain. Through its triple-token model, dynamic treasury management, and multi-layered security architecture, the project is designed for long-term viability rather than short-term speculation.

The combination of idle gameplay mechanics, deep breeding systems, competitive PvP, and guild-based territory control creates a rich, engaging experience accessible to Telegram's global user base.

Key Differentiators: 1. Triple-token separation prevents single-point economic failure 2. Dynamic economic controls adapt to market conditions in real-time 3. Multi-oracle pricing eliminates manipulation risks 4. Production-grade security with cryptographic verification at every layer 5. 14-language support for true global accessibility

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Feline Dynasty - The Neon Shogun Protocol Building the future of cat-driven economy on TON Blockchain.

Disclaimer: This whitepaper is for informational purposes only. It does not constitute financial advice. Token values and game mechanics are subject to change based on economic conditions and development priorities. Always do your own research before participating in any blockchain-based project.

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