# Extraction Schema for Token Analysis

This document outlines the structured schema for extracting information related to regulatory, legal, operational, governance, and insurance factors for various crypto token types. This schema is intended to be used with tools like LlamaExtract (potentially as a Pydantic model) to guide the information extraction process from source documents (e.g., whitepapers, legal terms, audit reports).

Each extracted piece of information should ideally be accompanied by a reference to its source within the analyzed document(s) (e.g., page number, section heading, URL if applicable).

## General Structure for Each Token

```
{
 "token_name": "string (Name of the token, e.g., USDC, wBTC, Lido Staked ETH)",
 "token_type_identified": "string (e.g., Stablecoin - RWA Backed, Stablecoin - Active Strategy, Custodian/Wrapped Token, Liquid Staking Token)",
 "source_documents_analyzed": [
  {
   "document_name_or_url": "string",
   "document_type": "string (e.g., Whitepaper, Terms of Service, Audit Report, Webpage)"
  }
 ],
 "extraction_summary": {
  "overall_confidence": "string (e.g., High, Medium, Low - based on information availability)",
  "key_findings_or_gaps": "string (Brief summary of significant findings or information gaps)"
 },
 "factors": {
  // Sections for Regulatory, Legal, Operational, Governance, Insurance factors will follow
 }
}
```

## I. Stablecoin Factors

This section applies to tokens identified as Stablecoins. Sub-categories like RWA Backed, Active Strategy, or Alternative Asset Backed will influence the relevance and specifics of some factors.

## A. Regulatory Factors (Stablecoins)

```
"regulatory_factors": {
 "licensing_and_registration": {
  "issuer_licenses_obtained": [
   {
    "license_name":
"string (e.g., BitLicense, Money Transmitter License, Bermuda DABA Class F)",
    "issuing_authority": "string (e.g., NYDFS, FinCEN, Bermuda Monetary
Authority)",
    "jurisdiction": "string (e.g., New York, USA; Federal, USA; Bermuda)",
    "status": "string (e.g., Active, Pending, Not Applicable)",
    "notes": "string (Any relevant details, effective dates, limitations)"
   }
  ],
  "regulatory_oversight_level": {
   "classification": "string (e.g., State-Chartered Trust, Federally Chartered Trust,
International Equivalents - Tier 1-4, VASP)",
   "primary_regulator": "string (Name of the primary regulatory body)",
   "primary_jurisdiction": "string (e.g., United States, Bermuda, Hong Kong SAR,
Switzerland, UAE)",
   "notes": "string"
  },
  "compliance_with_specific_regulations": {
   "sec_registration_status":
"string (e.g., Registered, Exempt - e.g., Regulation D, Not Registered, Not
Applicable)",
   "fincen_msb_registration": "string (e.g., Registered, Not Registered, Not
Applicable)",
   "other_relevant_compliances": "string (e.g., Travel Rule compliance, FATF
recommendations adherence)",
   "notes": "string"
  },
  "clarity_of_regulatory_treatment_for_strategy": {
    "assessment": "string (Applicable for Active Strategy/Alternative Asset; e.g.,
Clear, Ambiguous, Under Scrutiny)",
    "jurisdictional_variations": "string (Notes on how different jurisdictions view
the specific stablecoin strategy)",
    "notes": "string"
  }
}
```

## B. Legal Factors (Stablecoins)

```
"legal_factors": {
 "issuer_legal_structure": {
  "entity_type": "string (e.g., Trust, Fiduciary, Corporation, Foundation)",
  "jurisdiction_of_incorporation": "string",
  "bankruptcy_remoteness": {
```

```
      "assessment": "string (e.g., Strong, Moderate, Weak, Not Clear - based on structure and legal opinions)",
      "supporting_mechanisms": "string (e.g., Trust structure, specific legal provisions)",
      "notes": "string"
    },
    "notes": "string"
  },
  "user_rights_and_terms_of_service": {
    "clarity_of_terms": "string (e.g., Clear and Unambiguous, Moderately Clear, Ambiguous)",
    "redemption_rights": {
      "direct_redemption_for_users": "boolean",
      "conditions_or_limitations": "string (e.g., Minimum redemption amount, KYC requirements, geographical restrictions)",
      "process_clarity": "string"
    },
    "claim_on_reserves": {
      "nature_of_claim": "string (e.g., Direct claim, Beneficial interest, Unsecured creditor)",
      "enforceability": "string (e.g., Clearly enforceable, Subject to conditions, Unclear)"
    },
    "governing_law_of_terms": "string (Jurisdiction)",
    "notes": "string"
  },
  "counterparty_risk_legal_agreements": {
      "assessment": "string (Applicable for Active Strategy; e.g., Robust agreements, Standard agreements, Potential weaknesses)",
      "enforceability_of_claims": "string (Against counterparties in the strategy)",
      "notes": "string"
  },
  "perfection_of_security_interests_in_collateral": {
      "assessment": "string (Applicable for Alternative Asset Backed; e.g., Clearly perfected, Process unclear, Potential risks)",
      "legal_mechanisms": "string (How security interests are established and maintained)",
      "notes": "string"
  }
}
```

### C. Operational Factors (Stablecoins)

```
  "operational_factors": {
    "reserves_management": {
      "operational_history_years": "integer | string (Issuer/Manager's years of operation)",
      "transparency_of_reserves": {
        "attestation_frequency": "string (e.g., Daily, Monthly, Quarterly, Ad-hoc, None)",
```

```
    "auditor_name": "string (Name of the auditing firm, if applicable)",
    "audit_report_accessibility": "string (e.g., Publicly available, Available on request, Not available)",
    "real_time_monitoring_availability": "boolean"
   },
   "quality_and_liquidity_of_reserve_assets": {
    "asset_composition_breakdown": "string (e.g., % Cash, % US Treasuries, % Commercial Paper, % Other)",
    "credit_quality_of_assets": "string (e.g., Predominantly AAA/AA, Investment Grade, Mixed, Unrated)",
    "liquidity_profile": "string (e.g., Highly liquid, Moderately liquid, Potential liquidity issues)"
   },
   "notes": "string"
  },
  "redemption_mechanism": {
   "efficiency": "string (e.g., Typically processed within X hours/days, Known delays, Unclear)",
   "reliability": "string (e.g., Consistently reliable, Occasional issues reported, Unproven)",
   "associated_fees": "string (Description of redemption fees, if any)",
   "notes": "string"
  },
  "third_party_custodians_for_reserves": [
   {
    "custodian_name": "string",
    "assets_custodied": "string (Description of assets they hold)",
    "regulatory_status_of_custodian": "string",
    "assessed_quality_or_rating": "string (e.g., S&P Rating, Internal Assessment)",
    "notes": "string"
   }
  ],
  "strategy_execution_and_risk_management": {
    "description": "string (Applicable for Active Strategy; robustness of systems, rebalancing, collateral management)",
    "oracle_dependencies": {
      "usage": "string (Which oracles are used and for what purpose)",
      "reliability_and_security_assessment": "string (e.g., Reputable providers, Decentralized, Potential risks identified)"
    },
    "notes": "string"
  },
  "volatility_and_liquidity_management_of_collateral": {
    "description": "string (Applicable for Alternative Asset Backed; procedures for managing price volatility and market liquidity)",
    "notes": "string"
  },
  "custody_of_alternative_asset_collateral": {
    "method": "string (Applicable for Alternative Asset Backed; e.g., Self-custody, Third-party custodian, Smart contract)",
    "security_measures": "string",
    "notes": "string"
```

```
  },
  "cross_chain_risks_for_collateral": {
    "assessment": "string (Applicable if collateral is on different chains; e.g., Bridge security, Interoperability risks)",
    "mitigation_measures": "string",
    "notes": "string"
  }
}
```

### D. Governance Factors (Stablecoins)

```
 "governance_factors": {
  "issuer_or_strategy_governance_structure": {
   "entity_type": "string (e.g., Centralized Company, DAO, Foundation Committee)",
   "decision_making_process": "string (Description of how key decisions are made)",
   "key_personnel_or_entities": "string (Identified individuals, roles, or entities with significant control)",
   "transparency_of_governance": "string (e.g., Public meeting minutes, Voting records, Opaque)",
   "notes": "string"
  },
  "smart_contract_governance": {
   "upgradeability_mechanism": "string (e.g., Admin key, Multi-sig, Timelock, DAO vote, Immutable)",
   "control_distribution": "string (Who holds the keys/power to upgrade or change parameters)",
   "security_protocols_for_changes": "string (e.g., Audits before upgrade, Bug bounty programs)",
   "notes": "string"
  },
  "collateral_management_governance": {
    "decision_makers": "string (Applicable for Alternative Asset Backed; who decides on collateral types, liquidation parameters)",
    "process_description": "string",
    "notes": "string"
  },
  "strategy_parameter_control": {
    "controlling_entity": "string (Applicable for Active Strategy; who controls parameters of the active strategy)",
    "update_process": "string",
    "emergency_protocols": "string (e.g., Emergency shutdown, Pause functionality)",
    "notes": "string"
  }
}
```

### E. Insurance Factors (Stablecoins)

```
 "insurance_factors": {
  "insurance_on_reserve_assets": {
    "is_insured": "boolean",
    "coverage_type": "string (e.g., FDIC for cash, Private crime/specie insurance for other assets)",
    "insurer_name": "string",
    "coverage_amount_or_limits": "string",
    "beneficiary": "string (e.g., The Trust, The Issuer, Token Holders directly)",
    "exclusions_or_limitations": "string",
    "notes": "string"
  },
  "insurance_for_strategy_specific_risks": {
      "is_insured": "boolean (Applicable for Active Strategy/Alternative Assets)",
      "risks_covered": "string (e.g., Smart contract exploits, Counterparty default, Oracle failure)",
      "coverage_details": "string",
      "notes": "string (Likely rare or highly specialized)"
  }
}
```

---

## II. Custodian / Wrapped Token Factors

This section applies to entities providing custody services or issuing wrapped tokens.

### A. Regulatory Factors (Custodian/Wrapped)

```
 "regulatory_factors": {
  "custody_licensing": {
    "licenses_obtained": [
      {
        "license_name": "string (e.g., Trust Charter, VASP with custody permission, State MTL with custody provisions)",
        "issuing_authority": "string (e.g., NYDFS, OCC, FinCEN, State banking regulator)",
        "jurisdiction": "string",
        "status": "string",
        "notes": "string"
      }
    ],
    "notes": "string"
  },
  "aml_cft_compliance": {
    "program_robustness_assessment": "string (e.g., Based on public information, audits - Strong, Adequate, Needs Improvement, Unclear)",
```

```
    "key_compliance_features": "string (e.g., Transaction monitoring, KYC/CDD procedures, SAR filing)",
    "notes": "string"
  }
}
```

### B. Legal Factors (Custodian/Wrapped)

```
 "legal_factors": {
  "legal_status_of_custodied_assets": {
    "holding_structure": "string (e.g., In Trust, Bailment, Segregated accounts, Omnibus account)",
    "bankruptcy_remoteness_for_custodied_assets": {
      "assessment": "string (e.g., Strong protections, Moderate, Unclear, Dependent on jurisdiction)",
      "legal_basis": "string (e.g., Trust law, Specific contractual provisions, Statutory protections)"
    },
    "notes": "string"
  },
  "terms_of_custody_agreement_or_wrapping_service": {
    "clarity_of_terms": "string",
    "liability_of_custodian": "string (e.g., For negligence, For loss of keys, Limitations of liability)",
    "user_rights_to_underlying_assets": "string (e.g., Direct claim, Entitlement through custodian)",
    "governing_law": "string",
    "notes": "string"
  }
}
```

### C. Operational Factors (Custodian/Wrapped)

```
 "operational_factors": {
  "security_of_custody_technology": {
    "key_management_technology": "string (e.g., MPC, HSMs, Cold storage, Multi-sig)",
    "security_audits_and_certifications": [
      {
        "audit_type_or_certification": "string (e.g., SOC 2 Type II, ISO 27001, Penetration Test)",
        "auditor_name": "string",
        "date_or_frequency": "string",
        "summary_of_findings": "string (If available)"
      }
    ],
    "physical_security_measures": "string (If applicable and known)",
    "notes": "string"
```

```
  },
  "minting_and_burning_process_wrapped_tokens": {
    "process_description": "string (How wrapped tokens are created and redeemed
for underlying)",
    "security_measures":
"string (e.g., Multi-sig controls, Audit trails, Segregation of duties)",
    "reliability_and_efficiency": "string",
    "transparency_of_backing": "string (e.g., Proof of reserves, On-chain
verification)",
    "notes": "string"
  },
  "operational_resilience": {
    "business_continuity_plan_summary": "string (If available)",
    "disaster_recovery_capabilities": "string (If available)",
    "incident_response_plan_summary": "string (If available)",
    "notes": "string"
  }
}
```

### D. Governance Factors (Custodian/Wrapped)

```
 "governance_factors": {
  "corporate_governance_of_custodian": {
    "management_team_experience_and_reputation": "string",
    "board_structure_and_oversight": "string (If applicable)",
    "ownership_structure": "string (e.g., Publicly traded, Privately held, VC-backed)",
    "transparency_of_corporate_governance": "string",
    "notes": "string"
  },
  "control_over_custody_operations": {
    "internal_controls_description": "string (e.g., Dual controls, Segregation of
duties, Access controls)",
    "approval_processes_for_asset_movement": "string",
    "notes": "string"
  }
}
```

### E. Insurance Factors (Custodian/Wrapped)

```
 "insurance_factors": {
  "custody_insurance_specie_insurance": {
    "is_insured": "boolean",
    "coverage_type": "string (e.g., Crime, Specie, Cyber, Professional Indemnity)",
    "insurer_name_or_panel": "string",
    "coverage_amount_or_limits": "string (Per incident, Aggregate)",
    "scope_of_coverage": "string (e.g., Hot storage, Cold storage, Transit)",
    "key_exclusions": "string",
    "beneficiary": "string (e.g., Custodian, Custodian's clients)",
```

```
    "notes": "string"
  }
}
```

---

## III. Liquid Staking Token (LST) Factors

This section applies to tokens representing staked assets.

### A. Regulatory Factors (LSTs)

```
 "regulatory_factors": {
  "regulatory_classification_of_lst": {
    "assessment_in_key_jurisdictions":
"string (e.g., Potential security, Utility token, Unclear, Commodity)",
    "relevant_regulatory_statements_or_guidance": "string",
    "notes": "string"
  },
  "staking_provider_or_node_operator_regulation": {
    "regulatory_requirements_for_providers": "string (Are the underlying staking
providers subject to specific regulations?)",
    "compliance_status_of_providers": "string (If known)",
    "notes": "string"
  }
}
```

### B. Legal Factors (LSTs)

```
 "legal_factors": {
  "legal_relationship_with_staked_assets": {
    "nature_of_lst_holder_claim": "string (e.g., Direct claim on underlying, Claim
against protocol, Beneficial interest)",
    "enforceability_of_claim": "string",
    "notes": "string"
  },
  "terms_of_service_of_lst_protocol": {
    "clarity_of_terms": "string",
    "rights_and_responsibilities_of_lst_holders": "string",
    "protocol_operator_dao_liability": "string",
    "governing_law": "string",
    "notes": "string"
  }
}
```

## C. Operational Factors (LSTs)

```
 "operational_factors": {
  "smart_contract_security": {
   "audit_reports": [
    {
     "auditor_name": "string",
     "date_of_audit": "string",
     "key_findings_or_vulnerabilities": "string",
     "remediation_status": "string",
     "report_url": "string (If public)"
    }
   ],
   "bug_bounty_program_details": "string (e.g., Active, Platform used, Max payout)",
   "formal_verification_status": "string (e.g., Applied to critical contracts, Not applied, In progress)",
   "incident_history": "string (Details of any past security incidents)",
   "notes": "string"
  },
  "validator_performance_and_slashing_risk": {
   "validator_selection_process": "string (How validators are chosen and vetted)",
   "performance_monitoring_mechanisms": "string",
   "slashing_mitigation_strategies": "string (e.g., Diversification, Monitoring, Slashing insurance/coverage fund)",
   "historical_slashing_incidents": "string (Number and impact of past incidents)",
   "notes": "string"
  },
  "oracle_data_feed_dependency": {
   "usage_of_oracles": "string (e.g., For reward calculation, Pricing, Staking ratios)",
   "oracle_providers_used": "string",
   "reliability_and_security_assessment": "string",
   "notes": "string"
  },
  "withdrawal_unstaking_process": {
   "mechanism_description": "string (e.g., Direct unstaking, Liquidity pool swap, Queue system)",
   "efficiency_and_timeliness": "string (e.g., Expected duration, Known delays or bottlenecks)",
   "associated_fees_or_penalties": "string",
   "lock_up_periods": "string",
   "notes": "string"
  }
 }
```

## D. Governance Factors (LSTs)

```
 "governance_factors": {
  "protocol_governance_dao_structure": {
```

```
    "governance_token_details": "string (Name, Distribution, Utility)",
    "voting_mechanism": "string (e.g., On-chain, Off-chain snapshot, Weighted
voting)",
    "participation_levels": "string (e.g., Active, Low, Dominated by few holders)",
    "transparency_of_proposals_and_voting": "string",
    "key_parameters_controlled_by_governance":
"string (e.g., Fees, Validator sets, Upgrades, Treasury)",
    "notes": "string"
  },
  "upgradeability_of_contracts": {
    "upgrade_mechanism": "string (e.g., Admin key, Multi-sig, Timelock with DAO
vote, Proxy pattern)",
    "control_over_upgrades": "string (Who can initiate and approve upgrades)",
    "security_measures_for_upgrades": "string (e.g., Audits, Timelocks, Community
review period)",
    "notes": "string"
  }
}
```

### E. Insurance Factors (LSTs)

```
 "insurance_factors": {
  "slashing_insurance_or_coverage": {
    "is_covered": "boolean",
    "coverage_provider_or_mechanism": "string (e.g., Nexus Mutual, Protocol
treasury fund, Third-party insurer)",
    "coverage_amount_or_limits": "string",
    "scope_of_coverage": "string (Which validators, types of slashing events)",
    "claim_process": "string",
    "notes": "string"
  },
  "smart_contract_exploit_insurance": {
    "is_covered": "boolean",
    "coverage_provider":
"string (e.g., Nexus Mutual, Sherlock, Other DeFi insurance protocols)",
    "coverage_amount_or_limits": "string",
    "scope_of_coverage": "string (Which contracts, types of exploits)",
    "claim_process": "string",
    "notes": "string"
  }
}
```

---

This schema provides a comprehensive starting point. It will likely be refined during the PoC implementation, especially when translating it into a Pydantic model for LlamaExtract, to ensure it's both practical for extraction and meets the detailed analysis needs.