

Below is **the full, production-grade taxonomy** of **Ramps for Crypto** — both **centralized** and **decentralized**, with **main types, sub-types, flows, components, risks, compliance, metrics, and infrastructure layers**.

This is the **complete features master list** you can use in your DEX ecosystem (Monkol-DEX / RX-Exchange / Serey-DEX).

☑ **Crypto Ramp – Complete Features, Main Types, Sub-Types & All Components**

0. What is a Ramp?

A **ramp** is the system enabling users to **move value between fiat ↔ crypto** and between **crypto ↔ crypto ecosystems**, including wallets, smart contracts, and banking rails.

A complete ramp stack has:

- **On-Ramp (Fiat → Crypto)**
- **Off-Ramp (Crypto → Fiat)**
- **Cross-Ramp (Chain → Chain)**
- **DeFi-Ramp (DEX/Smart-contract → Fiat rails indirectly)**

☑ **1. Main Types of Crypto Ramps (4 Total)**

1) Fiat → Crypto On-Ramp

Used when user **buys crypto** using fiat money.

Sub-Types

1. Card-based On-Ramp

- VISA, MasterCard, AMEX, UnionPay
- 3DS, 2DS validation
- KYC/AML checks

2. Bank Transfer On-Ramp

- ACH (US)
- SEPA (EU)
- PIX (Brazil)
- SWIFT (International)

3. E-Wallet On-Ramp

- Apple Pay
- Google Pay
- GrabPay
- Dana

4. **Cash-Based On-Ramp**

- Over-the-counter (OTC)
- Retail kiosk deposits

5. **Fiat Stablecoin Minting**

- USDC issuance nodes
- USDT issuance parties

Core Components

- KYC/AML Engine
- Card processor / Acquirer
- Bank settlement layer
- Ledger + reconciliation
- Risk Engine (velocity limits, fraud checks)
- Quote + FX rate engine
- Crypto payout (on-chain execution)
- Receipts + invoices (regulatory)

2) Crypto → Fiat Off-Ramp

When user **sells crypto** and wants **fiat settlement**.

Sub-Types

1. **Bank Withdrawal**

- ACH / SEPA / SWIFT

2. **Card Payout (Visa Direct / MasterCard Send)**

3. **Cash Out / ATM**

4. **Mobile Money**

- M-Pesa
- GCash
- TrueMoney

5. **Merchant Settlement**

- Retail → fiat settlement

Core Components

- Crypto intake (smart contracts → custody)
 - AML blockchain monitoring (Chainalysis, TRM Labs)
 - Fiat rails payout engines
 - Withdrawal queues
 - Treasury + liquidity pool
 - Price locking / slippage engine
 - Banking compliance APIs
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3) Cross-Ramp (Crypto ↔ Crypto)

This is **DEX ↔ CEX ↔ Bridges ↔ Wallets**.

Sub-Types

1. **CEX → Wallet** (withdraw/deposit)
2. **Wallet → Wallet** (P2P)
3. **DEX Swap (AMM Pools)**
4. **Cross-Chain Bridges**
 - Wormhole
 - LayerZero
 - Axelar
 - Thorchain
5. **DEX Liquidity Provider Ramp**
 - LP/Stake/Unstake → convert to chain token

Core Components

- Bridge verifier
 - Oracle/Relayer
 - Proof-of-reserves
 - Cross-chain transaction manager
 - AMM router
 - Slippage + MEV protection
 - Gas abstraction/relayer
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4) DeFi-Ramp (Decentralized Fiat-Like Access)

Fully decentralized methods to go from **fiat-like assets** → **crypto**, but without banks.

Sub-Types

1. P2P Orderbook (Escrow Smart Contract)

- Binance P2P model
- LocalCryptos

2. Stablecoin Swap

- USDC ↔ PayPal USD
- USDT ↔ Cash stable tokens

3. Synthetic Fiat

- MakerDAO's DAI minting
- Frax

4. Real-World Asset (RWA) Ramp

- Tokenized bonds
- Tokenized invoices

5. Decentralized Credit Ramp

- On-chain loans
- Collateral → stablecoin mint

Core Components

- Smart contract escrow
- Arbitrator logic
- KYC-less risk model
- Reputation system
- Price oracles
- Settlement watchers
- Automated dispute bots

☒ 2. COMPLETE FEATURES – By Layer

Here is the **full stack** of components every ramp must have.

☒ A. Identity & Compliance Layer

Type	Sub-Type	Features
KYC	Basic / Advanced / Video / Biometric	Document OCR, Liveness, Face match
AML	Transaction Monitoring	Chain analysis, address risk scoring
Sanctions Screening	OFAC, UN, EU	Real-time block list

Type	Sub-Type	Features
Fraud Engine	Behavioral, velocity, device	Risk scoring, bot detection
Travel Rule	VASP-to-VASP	IVMS101 messaging
KYB	Business onboarding	UBO checks

☑ B. Fiat Payment Layer

Type	Sub-Type	Components
Card Payments	Visa, MasterCard, Amex, UnionPay	Acquirer, PSP, 3DS, bin lookup
Banks	ACH/SEPA/SWIFT/PIX	Bank API, settlement queue
E-Wallets	GrabPay, PayPal, ApplePay	Tokenized card, risk
Cash Rails	ATM / Retail store deposits	Barcode, kiosk device
Merchant	POS terminals	Reconciliation engine

☑ C. Crypto Execution Layer

Type	Component	Features
Smart Contracts	Escrow, bridge, AMM	Safe math, slippage control
Custody	MPC, HSM	Withdrawal policy engine
Cold Wallets	Multisig	Threshold signatures
Hot Wallets	Automated payout	Fee estimation & gas management
AMM Router	Swap logic	Best-path routing
Oracle	Price feeds	TWAP, MEV-protected

☑ D. Trading & Price Layer

Feature	Description
Price engine	Quote generation, FX rate, depth aggregation
Market-making bots	Liquidity spread control
Slippage guarantee	User-locking prices for 20-60 seconds
Risk engine	Fraud scoring, velocity checks

☑ E. Treasury & Liquidity Layer

Component	Features
Fiat liquidity pools	Per-currency funding buckets
Crypto liquidity pools	BTC/ETH/USDT/USDC pools
Real-time ledger	Double-entry ledger accounting
Reconciliation engine	Bank ↔ blockchain matching
Settlement buffers	Insider float management

✓ F. Infrastructure Layer

Component	Features
API Gateway	Rate limiting, JWT, mTLS
Webhooks	Callback for status updates
Queue system	Kafka/NATS JetStream
Observability	Tracing, metrics, logs
High availability	Multi-region load balancing
Compliance logs	Immutable audit logs

✓ 3. FULL RAMP FLOW (END-TO-END)

On-Ramp

1. Quote & price lock
2. KYC/AML
3. Payment initiation (card/bank/wallet)
4. Payment confirmation
5. Treasury allocation
6. On-chain crypto payout
7. Receipt & reporting

Off-Ramp

1. Deposit crypto
2. Chain monitoring AML
3. Quote lock
4. Fiat payout via bank/visa direct
5. Reconciliation
6. Notification

Cross-Ramp

1. Chain A lock
2. Relayer/oracle verify
3. Chain B mint
4. Settlement finality

☒ 4. RAMP RISKS / PROTECTION LAYERS

Category	Risk	Controls
Payment Fraud	Stolen cards	3DS, velocity rules
AML Risk	Illicit funds	Chainalysis/TRM labs
Slippage	Fast market move	TWAP, 20–60s lock
Liquidity Risk	Pool dry	Daily treasury monitoring
CEX Risk	Exchange outage	Multi-CEX redundancy
Smart Contract Risk	Bug/exploit	Audit + formal verification

☒ 5. RAMP METRICS

- KYC pass rate
 - Payment success rate
 - Chargeback ratio
 - Withdrawal success time
 - Treasury liquidity levels
 - On-chain confirmation time
 - Compliance audit logs
 - Customer dispute rate
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☒ 6. RAMP TOOLS & PROVIDERS (Reference List)

Centralized Ramps

- MoonPay
- Ramp Network
- Transak
- Stripe Crypto
- Sardine
- Coinbase Commerce

Decentralized Ramps

- LocalCryptos / LocalMonero
- Bisq
- Thorchain
- Li.Fi
- LayerZero
- Axelar

☒ If You Want CSV Version

I can generate the CSV exactly like your **defence_layers_master.csv** and **attack_layers_master.csv**:

☒ Columns:

type,subtype,component,features,goal,tools,metrics,risks

Just say: **“Convert this to CSV”**.

☒ Want the **Ramp Architecture Diagram** (Mermaid + YAML deployment blueprint)**?

I can generate:

- ☒ ramp_system.md
- ☒ ramp_flows.mmd
- ☒ ramp_services.yaml
- ☒ full microservices layout for your Monkol-DEX.

Just tell me: **“Generate the ramp blueprint v1”**.

Would you like the **CSV**, **diagram**, or **microservices scaffold** next?