XyloNet Implementation Plan

Complete development roadmap for XyloNet - Stablecoin SuperExchange on Arc Network

Implementation Status Overview

Phase	Description	Status	Completion
Phase 1	Foundation (Contracts + Deployment)	✅ Complete	100%
Phase 2	Bridge Integration (CCTP V2)	✅ Complete	100%
Phase 3	Yield Features (ERC-4626 Vault)	✅ Complete	100%
Phase 4	UX/UI Polish & Mobile	✅ Complete	100%
Phase 5	Documentation & Launch Prep	✅ Complete	100%
Phase 6	Advanced Features	🔄 Planned	0%
Phase 7	Governance & Token	🔄 Planned	0%

Phase 1: Foundation ✅ COMPLETE

1.1 Project Setup

- ☑ Initialize Foundry/Hardhat project structure
- ☑ Initialize Next.js 16 frontend with TypeScript
- ☑ Configure Arc Testnet connection (Chain ID: 5042002)
- ☑ Setup environment variables and secrets
- ☑ Configure wagmi v2 and RainbowKit

1.2 Core Smart Contracts

- ☑ **XyloFactory.sol** - Pool deployment factory
  - createPool(), getPool(), setSwapFee(), setFeeRecipient()
- ☑ **XyloStablePool.sol** - StableSwap AMM implementation
  - Curve invariant with A=200
  - swap(), addLiquidity(), removeLiquidity()
- ☑ **XyloRouter.sol** - Trade routing and execution
  - swap(), addLiquidity(), removeLiquidity(), getAmountOut()
- ☑ **XyloERC20.sol** - LP token implementation
  - ERC20 standard with permit support

1.3 Interface Contracts

- ☑ IERC20.sol - ERC20 interface with Permit
- ☑ IXyloFactory.sol - Factory interface
- ☑ IXyloPool.sol - Pool interface

- ☑ IXyloRouter.sol - Router interface

1.4 Deployment

- ☑ Deploy XyloFactory to Arc Testnet
- ☑ Deploy XyloRouter to Arc Testnet
- ☑ Verify all contracts on Blockscout
- ☑ Create USDC-EURC Pool
- ☑ Create USDC-USYC Pool
- ☑ Add initial liquidity to pools

Phase 2: Bridge Integration ✅ COMPLETE

2.1 CCTP Bridge Contract

- ☑ **XyloBridge.sol** - CCTP V2 wrapper contract
    - bridgeOut() - Initiate cross-chain transfer
    - bridgeToChain() - Bridge by chain name
    - Support for depositForBurn with maxFee and hookData
- ☑ Deploy XyloBridge to Arc Testnet
- ☑ Verify on Blockscout

2.2 Bridge Frontend

- ☑ Chain selector component with official logos
- ☑ Bridge transaction flow with 4-step progress
- ☑ Real-time status tracking via events
- ☑ Circle Bridge Kit integration for auto-delivery
- ☑ Fast transfer mode support (~30 seconds)
- ☑ Error handling and retry logic

2.3 Supported Chains

- ☑ Ethereum Sepolia (Domain 0)
- ☑ Arbitrum Sepolia (Domain 3)
- ☑ Base Sepolia (Domain 6)
- ☑ Optimism Sepolia (Domain 2)
- ☑ Polygon Amoy (Domain 7)
- ☑ Avalanche Fuji (Domain 1)
- ☑ Arc Testnet (Domain 26)

Phase 3: Yield Features ✅ COMPLETE

3.1 Vault Contract

- ☑ **XyloVault.sol** - ERC-4626 compliant vault
    - deposit(), withdraw(), redeem()
    - previewDeposit(), previewWithdraw()
    - totalAssets(), convertToShares(), convertToAssets()

- ☑ Fee structure (0% deposit, 0.1% withdraw, 10% performance)
- ☑ Deploy to Arc Testnet
- ☑ Verify on Blockscout

3.2 Vault Frontend

- ☑ Vault dashboard with stats
- ☑ Deposit/withdraw modals
- ☑ APY calculation (dynamic based on TVL)
- ☑ Real-time balance updates
- ☑ Position tracking (shares → USDC value)

Phase 4: UX/UI Polish & Mobile ✅ COMPLETE

4.1 Design System

- ☑ Orbiter Finance-inspired dark theme
- ☑ CSS custom properties for theming
- ☑ Gradient accents and glass effects
- ☑ Consistent component styling
- ☑ Card hover animations

4.2 Enhanced Components

- ☑ **SwapWidget** - MAX button, USD values, price impact
- ☑ **BridgeWidget** - Chain logos, progress steps, status
- ☑ **Pools page** - TVL sparklines, analytics cards
- ☑ **Vault page** - APY sparkline, position tracking
- ☑ **History page** - Filter tabs, status badges

4.3 UI Components

- ☑ **Toast** - Transaction notifications
- ☑ **TokenLogo** - Official USDC, EURC, USYC logos
- ☑ **ChainLogo** - Official chain logos (Ethereum, Arbitrum, etc.)
- ☑ **Skeleton** - Loading states
- ☑ **Tooltip** - Info tooltips for DeFi terms
- ☑ **Confetti** - Success celebrations
- ☑ **EmptyState** - No data states

4.4 Mobile Responsiveness

- ☑ **Header.tsx** - Compact mobile navigation, hamburger menu
- ☑ **SwapWidget.tsx** - Responsive font sizes, touch targets
- ☑ **BridgeWidget.tsx** - Stacked layout, bottom sheet modal
- ☑ **Pools page** - Card view on mobile, grid stats
- ☑ **Vault page** - Responsive stats, stacked buttons
- ☑ **History page** - Card list on mobile, compact filters
- ☑ **Footer.tsx** - Reordered for mobile

- ☑ **globals.css** - Mobile-specific CSS (200+ lines)
  - Touch targets 44-48px minimum
  - Safe area insets for notched devices
  - Active state feedback (scale animations)
  - Horizontal scroll for filters
  - Bottom sheet modals

Phase 5: Documentation & Launch Prep ✅ COMPLETE

5.1 Documentation

- ☑ **README.md** - Quick start, architecture overview
- ☑ **XYLONET_PROJECT.md** - Ultimate detailed documentation
- ☑ **contracts/README.md** - Smart contract docs with examples
- ☑ **SECURITY.md** - Security considerations
- ☑ **CONTRIBUTING.md** - Contribution guidelines
- ☑ **LICENSE** - MIT License

5.2 Code Quality

- ☑ Frontend builds successfully
- ☑ No TypeScript errors
- ☑ All contracts verified on Blockscout
- ☑ ABIs properly exported
- ☑ Constants file complete

5.3 Git Repository

- ☑ Clean git history
- ☑ All features pushed to main branch
- ☑ Repository public on GitHub

Phase 6: Advanced Features 🔄 PLANNED

6.1 StableFX Integration

- ☐ RFQ integration for large trades
- ☐ FxEscrow contract interaction
- ☐ Optimal routing (AMM vs RFQ)
- ☐ Price improvement for large orders

6.2 Account Abstraction

- ☐ Pimlico/ZeroDev integration
- ☐ Gasless transactions
- ☐ Session keys for automation
- ☐ Social login options

6.3 AI Agent Interface

- ☐ MCP tool definitions
- ☐ Natural language parsing
- ☐ Automated trading actions
- ☐ Portfolio rebalancing

6.4 Limit Orders

- ☐ TWAP (Time-Weighted Average Price)
- ☐ Stop-loss orders
- ☐ Take-profit orders
- ☐ Order book display

Phase 7: Governance & Token 🔄 PLANNED

7.1 Token Contracts

- ☐ **XyloToken.sol** - XYLO ERC20 governance token
- ☐ **XyloStaking.sol** - Staking for fee sharing
- ☐ **XyloGovernor.sol** - DAO governance

7.2 Token Features

- ☐ Protocol fee distribution to stakers
- ☐ Voting mechanism for proposals
- ☐ Timelock for security
- ☐ Proposal system

7.3 Launch

- ☐ Token generation event
- ☐ Liquidity mining program
- ☐ CEX listings
- ☐ Marketing campaign

Deployed Contract Addresses

XyloNet Contracts (Arc Testnet)

Contract	Address	Verified
XyloFactory	0x60EDeFB094B84BBC6430cc130B358A43Ba1979e2	✅
XyloRouter	0x73742278c31a76dBb0D2587d03ef92E6E2141023	✅
XyloBridge (V2)	0xf7Df65Ce418E938ee8d9a0A0d227A43441fe4641	✅
XyloVault	0x240Eb85458CD41361bd8C3773253a1D78054f747	✅
USDC-EURC Pool	0x3DF3966F5138143dce7a9cFDdC2c0310ce083BB1	✅
USDC-USYC Pool	0x8296cC7477A9CD12cF632042fDDc2aB89151bb61	✅

Arc Network Native Contracts

Contract	Address
USDC (Native)	0x3600000000000000000000000000000000000000
EURC	0x89B50855Aa3bE2F677cD6303Cec089B5F319D72a
USYC	0xe9185F0c5F296Ed1797AaE4238D26CCaBEadb86C
TokenMessengerV2	0x8FE6B999Dc680CcFDD5Bf7EB0974218be2542DAA
MessageTransmitterV2	0xE737e5cEBEEBa77EFE34D4aa090756590b1CE275
Gateway Wallet	0x0077777d7EBA4688BDeF3E311b846F25870A19B9
FxEscrow	0x1f91886C7028986aD885ffCee0e40b75C9cd5aC1
Permit2	0x000000000022D473030F116dDEE9F6B43aC78BA3
Multicall3	0xcA11bde05977b3631167028862bE2a173976CA11

Architecture Diagrams

Smart Contract Architecture

```
contracts/
├── src/
│   ├── core/
│   │   ├── XyloFactory.sol        ✅ Deployed & Verified
│   │   ├── XyloStablePool.sol     ✅ Deployed & Verified
│   │   ├── XyloRouter.sol         ✅ Deployed & Verified
│   │   └── XyloERC20.sol          ✅ Deployed & Verified
│   ├── bridge/
│   │   └── XyloBridge.sol         ✅ Deployed & Verified (CCTP V2)
│   ├── vault/
│   │   └── XyloVault.sol          ✅ Deployed & Verified
│   └── interfaces/
│       ├── IERC20.sol
│       ├── IXyloFactory.sol
│       ├── IXyloPool.sol
│       └── IXyloRouter.sol
├── scripts/
│   ├── deploy.js                  ✅ Deployment script
│   └── add-liquidity.js           ✅ Liquidity script
├── artifacts/                     ✅ Compiled ABIs
├── hardhat.config.js
└── package.json
```

Frontend Architecture

```
frontend/
├── src/
│   ├── app/
│   │   ├── page.tsx              ✅ Home / Swap
│   │   ├── bridge/page.tsx       ✅ Bridge
│   │   ├── pools/page.tsx        ✅ Pools
│   │   ├── vault/page.tsx        ✅ Vault
│   │   ├── history/page.tsx      ✅ History
│   │   ├── layout.tsx            ✅ Root layout
│   │   └── globals.css           ✅ Global + Mobile CSS
│   ├── components/
│   │   ├── swap/
│   │   │   └── SwapWidget.tsx    ✅ Token swap
│   │   ├── bridge/
│   │   │   └── BridgeWidget.tsx  ✅ Bridge (Circle Kit)
│   │   ├── ui/
│   │   │   ├── Toast.tsx         ✅ Notifications
│   │   │   ├── TokenLogos.tsx    ✅ Token + Chain logos
│   │   │   ├── Skeleton.tsx      ✅ Loading states
│   │   │   ├── Tooltip.tsx       ✅ Info tooltips
│   │   │   ├── Confetti.tsx      ✅ Celebrations
│   │   │   └── EmptyState.tsx    ✅ Empty states
│   │   ├── Header.tsx            ✅ Navigation
│   │   ├── Footer.tsx            ✅ Footer + Socials
│   │   └── Providers.tsx         ✅ Web3 providers
│   ├── config/
│   │   ├── wagmi.ts              ✅ Wallet config
│   │   ├── constants.ts          ✅ Contract addresses
│   │   └── abis/index.ts         ✅ Contract ABIs
│   └── lib/
│       ├── utils.ts             ✅ Utilities
│       └── transactions.ts       ✅ Tx history
├── package.json
└── tsconfig.json
```

Tech Stack Summary

Smart Contracts

Technology	Version	Purpose
Solidity	0.8.30	Contract language
Hardhat	2.x	Development framework
OpenZeppelin	5.x	Security standards

Frontend

Technology	Version	Purpose

Next.js	16	React framework
TypeScript	5.x	Type safety
Tailwind CSS	4.x	Styling
wagmi	2.x	Ethereum hooks
viem	2.x	Ethereum client
RainbowKit	2.x	Wallet UI
Circle Bridge Kit	Latest	Cross-chain UI
Lucide React	Latest	Icons
Vercel Analytics	Latest	Analytics

Infrastructure

Service	Purpose
Arc Testnet	Blockchain network
Circle CCTP V2	Cross-chain messaging
Blockscout	Block explorer
GitHub	Version control
Vercel	Frontend hosting

Current Features Summary

Feature	Description	Status
Swap	Trade USDC ↔ EURC ↔ USYC with StableSwap curve	☑ Live
Pools	Add/remove liquidity, view reserves, earn fees	☑ Live
Bridge	Cross-chain USDC via Circle CCTP V2 (7 chains)	☑ Live
Vault	Deposit USDC to earn yield (ERC-4626)	☑ Live
History	View past transactions with filters	☑ Live
Mobile	Fully responsive design for all screens	☑ Live

Explorer Links

Contract	Explorer
Factory	https://testnet.arcscan.app/address/0x60EDeFB094B84BBC6430cc130B358A43Ba1979e2

Router	https://testnet.arcscan.app/address/0x73742278c31a76dBb0D2587d03ef92E6E2141023
Bridge	https://testnet.arcscan.app/address/0xf7Df65Ce418E938ee8d9a0A0d227A43441fe4641
Vault	https://testnet.arcscan.app/address/0x240Eb85458CD41361bd8C3773253a1D78054f747
USDC-EURC Pool	https://testnet.arcscan.app/address/0x3DF3966F5138143dce7a9cFDdC2c0310ce083BB1
USDC-USYC Pool	https://testnet.arcscan.app/address/0x8296cC7477A9CD12cF632042fDDc2aB89151bb61

Next Steps

1. **Mainnet Preparation**

   - Security audit by reputable firm
   - Bug bounty program
   - Mainnet deployment plan

2. **Advanced Features**

   - StableFX RFQ integration
   - Account abstraction (gasless)
   - AI agent tools

3. **Token Launch**

   - XYLO tokenomics design
   - Staking mechanism
   - DAO governance

XyloNet - Built for the Arc Network Ecosystem