

Milestone 1 - Specification Document

Milestone Title: Finalizing Research and Specifications for the Telegram Bot

Version: 1.0

Catalyst Project ID: 1300185

Acceptance-Criteria Mapping

Milestone 1 Requirement	Where Addressed
Comprehensive feature & data list	Sections 4 & 5
Basic application architecture	Section 3 (diagram + description)
Technical feasibility for each feature	Section 6
Team review & approval	Internal review completed ✓

1 Executive Summary

Cardano Sentinel is a real-time monitoring and alerting platform for the Cardano blockchain. It tracks token prices, wallet activity, liquidity-pool shifts, and major DEX swaps, delivering intelligent alerts through Telegram (primary interface) and—optionally—Discord.

This document finalizes the functional scope, architecture, data sources, and technical feasibility required to satisfy Milestone 1.

2. Project Scope & Objectives

This section outlines the system's primary use cases, finalized bot configurations, and key functional goals.

2.1 Core User-Facing Use Cases

The system is designed to serve three primary user scenarios through purpose-built Telegram bot types:

1. **Personal** – Private 1:1 user chat for alerts, wallet tracking, and stat queries
2. **Public Broadcasting** – Community-facing alert channel for high-impact events
3. **Group Utility** – Lightweight group bot for live token price lookups inside Telegram groups

2.2 Final Bot Types & Features

The following summarises the features and functionality of each bot type that will be delivered.

Personal Bot (Private 1-to-1 Telegram Chat)

Users can:

- Query live token prices
→ /price
- Manage token watchlist
→ /add , /remove , /list
- Set price alerts ($\pm\%$ threshold)
→ /pricealert
- Enable large movement alerts
→ /movementalert
- Monitor wallet addresses
→ /watchaddress [label], /unwatchaddress , /addresses
- View active alerts
→ /showalerts




Behavior when monitoring a wallet address:

- The bot detects both incoming and outgoing transactions.
- If the transaction is a swap on a DEX, the system identifies it and provides swap details including the DEX name and trade breakdown.

Purpose: A personal assistant for real-time token and wallet tracking with configurable alerts.

Public Alerts Bot (Telegram Broadcast Channel)

This read-only bot posts automated alerts for key on-chain events:

1.  Token Price Alerts
 - Triggered on $\pm 5\%$ price change
 - Applies to the top 10 tokens
2.  Large Swap Alerts
 - Fires on swaps above a set threshold (e.g., >25K ADA)
 - Applies to the top 10 tokens
3.  Daily Summary
 - Once per 24 hours
 - Lists top 5 token stats

Purpose: Delivers high-signal insights and price movement notifications for public audiences.

Group Bot (Used in Telegram Groups)

Users can:

- Query token prices
Eg → /price wmtx

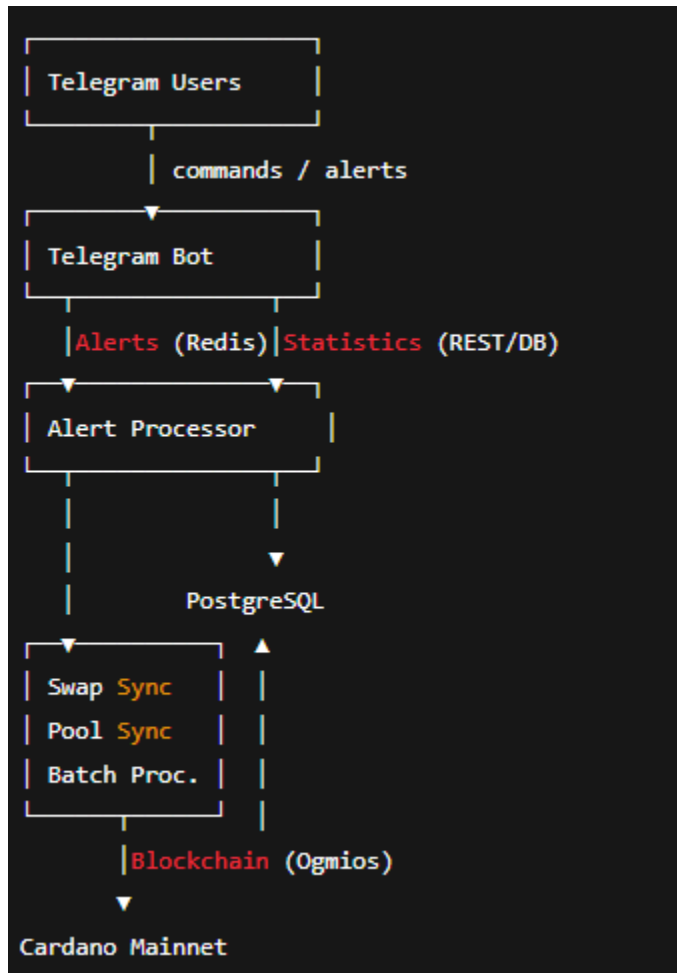
Purpose: Lightweight and non-intrusive. Allows group members to quickly check token prices without enabling alerts or subscriptions that could generate group spam.

2.3 Functional Objectives

The system is built to achieve the following operational goals:

- Real-time data ingestion and alert delivery (<60 seconds for public alerts)
- Wallet-based alert delivery
- Live token price query responses within 5 seconds
- Scalable infrastructure to support 20,000+ Cardano native tokens
- Efficient filtering and prioritization of top-volume tokens
- Modular architecture to support additional platforms (Discord, API, etc.)

3 System Architecture Overview



Components

- **Swap Sync:** real-time swaps from 12 DEXs.
- **Pool Sync:** liquidity-pool state.
- **Alert Processor:** business logic + Redis queues (high/med/low).
- **Telegram Bot:** user commands & alert push.
- **Batch Processor:** scheduled jobs (price checks, DB cleanup).

4 Feature Set

Available Commands (Personal Bot)

```
/start • /help • /price <token> • /add • /remove • /list •  
/pricealert <token> <percent> • /movementalert <token> •  
/watchaddress <addr> [label] • /unwatchaddress <addr> • /addresses •  
/showalerts • /coins
```

Stats & Data Points Tracked

- Live token price (current + OHLC) for ≥ 20 top-cap native tokens.
Wallet transactions (incoming / outgoing).
- Liquidity-pool TVL & reserve changes.
- Large swaps
- On-chain discovery of new tokens

Alert Types

Alert Type	Trigger Example	Delivery Target
Price Alert	$\pm 5\%$ (user-set)	DM / Group
Swap Alert	Swap > xx ADA	DM / Public
Address Alert	Watched wallet TX	DM
General Market	Token $\pm 5\%$	Public Channel

5 Data Sources & Dependencies

- **Blockchain:** Ogmios websocket
- **DEXs Tracked:** Minswap, Minswap V2, SundaeSwap, Sundaeswap V3, MuesliSwap, WingRiders, WingRiders V2, VyFinance, Spectrum, TeddySwap, Cerra, Splash, cswap.
- **Token Metadata:** Cardano Token Registry + on-chain discovery.
- **Storage:** PostgreSQL (21 tables, TypeORM).
- **Queues:** Redis (priority alert queues)
- **APIs:** Telegram Bot API

6 Technical Feasibility

All components described here are **already implemented and running in production**:

- Telegram bot responds within ≤ 5 s for `/price` on 20+ tokens.
- Redis queues process alerts with sub-second latency (tested under load). PostgreSQL & Ogmios sync stable.
- Public and private alert flows validated.
- Discord bot (bonus) shares the same backend code.

7 Evidence of Milestone Completion

- **This specification document** fulfills the research & planning deliverable.
- Optional annexes (screenshots / command demos) are ready for reviewers on request.
- Internal team sign-off completed.

8 Summary

The finalized specification confirms scope, architecture, and feasibility for the Cardano Sentinel Telegram bot, fully satisfying Milestone 1.