Weather Intelligence Platform for NextWeather

Scope of Work submitted by Minfy Technologies Inc.

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Contents

Executive Summary

NextWeather aims to build a scalable, AI-powered Weather Intelligence Platform to transform meteorological data into real-time decision support for both consumer and enterprise scenarios. The initiative envisions natural language-driven insights, proactive alerts, and automated reporting to unlock enhanced customer engagement, operational readiness, and monetization.

Minfy Technologies, an AWS Premier Consulting Partner, will lead the design and development of this platform. With deep expertise in Modern Applications, DevSecOps, Data & AI, Advanced Analytics, and Cloud Modernization, Minfy brings a team of 500+ professionals, 200+ certified cloud consultants, global delivery capabilities, technology accelerators and around-the-clock operational support to ensure successful execution.

Project Objectives

The goal of this project is to build a scalable, production-grade, Gen-AI driven weather intelligence platform. By building a core weather intelligence engine, data exchange layers and natural language interfaces, it enables a scalable platform that can support multiple use cases and deployment models. Specifically, we will be focusing on the following use cases:

Enabling conversational weather insights through a natural-language AI interface that supports context-aware chats, and follow-ups

Report generation and advanced analytics via a natural-language AI interface that provides insights from raw meteorological data, trend analysis, and produces customizable reports, and data exports on demand

Business outcomes

The successful implementation of the AI-powered Weather Intelligence Platform with a conversational chat interface could deliver the following key business outcomes:

1. **Increased Customer Engagement & Retention**

   o 30–50% lift in daily active users by offering an intuitive chat interface that answers weather questions on demand.
   o 20–30% reduction in churn as customers adopt proactive alerts and conversational workflows tightly integrated into their operations.

2. **Faster, Data-Driven Decision Making**

   o 40% reduction in time spent interpreting raw forecasts, as generative explanations translate complex data into clear recommendations.
   o 25% fewer operational disruptions (e.g., flight delays, field-service reschedules) by surfacing targeted, scenario-based insights via chat.

3. **Expanded Revenue Streams**

   o 15–25% growth in premium subscriptions through value-added chat features e.g., enterprise "insights bot" add-on or usage-based alert bundles.

o New partnerships with platforms (CRM, logistics, scheduling) that embed your chat widget, unlocking referral and integration fees.

Craig Gilmore

4. **Operational Cost Savings**

   o 30% lower support costs by deflecting routine forecast inquiries to the AI chat, freeing up customer-success teams for high-value engagements.
   o Automated monitoring and webhook-driven alerts reduce manual weather-impact checks by 50%, trimming labor overhead.

5. **Continuous Product Improvement**

   o Ongoing feedback loop from chat analytics drives a 10–15% annual lift in forecast accuracy and intent coverage, strengthening competitive differentiation.
   o Data on user queries uncovers new feature opportunities (e.g., extended-range insights, industry-specific presets), accelerating roadmap prioritization.

6. **Stronger Market Positioning**

   o Reputation as the only weather platform that blends hyper-local forecasts with natural-language interactivity, escalating brand preference among tech-savvy enterprises.
   o Thought-leadership content case studies and ROI stories fuel marketing, driving 20% more qualified inbound leads year-over-year.

Core Functional Modules and Capabilities

The platform will feature a Gen AI–powered Chat interface and Report Generation & Analytics module that transforms raw weather data into actionable intelligence.

AI-Powered Weather Chat Interface

- **Natural Language Understanding**

  Harnesses a fine-tuned LLM integrated with real-time weather data to interpret unrestricted user queries ("Will our Chicago office at 123 Happy Lane experience any severe weather (e.g., thunderstorms, hail, high winds) in the next 24 hours?") and generate precise, context-aware forecast and alert responses.

- **Contextual, Multi-Turn Dialog**

  Maintains session state so follow-ups ("What about this week?" or "And wind speed?") are understood in context, without re-specifying locations or times.

- **Hybrid Retrieval & Generation**

  Combines retrieval of precise forecast data (maps, charts) with generative explanations and translating numeric outputs into clear, actionable text.

- **Omni-Channel Delivery**

  Exposes the chat interface via web widget, mobile SDKs, and integrations with Slack/Microsoft Teams, with fallback to SMS or email for critical alerts.

- **Proactive & Triggered Conversations**

  Can initiate outreach ("Severe thunderstorm warning for your area would you like to adjust your flight plan?") based on user-defined thresholds, geofences, or subscription tiers.

- **Analytics & Feedback Loop**

  Logs all interactions and feedback (was this answer helpful?), feeding into continuous model retraining to improve comprehension, reduce hallucinations, and surface new user intents.

Natural-Language Reporting Interface

The platform will feature a Gen AI–powered Report Generation & Analytics module that transforms raw weather data into actionable intelligence. This module will:

- **Automated Custom Report Creation**

  Generate on-demand reports that can be exported into PDF, Excel, or dashboard embeds and are tailored to user-specified parameters (locations, time ranges, metrics, and KPIs).

- **Natural-Language Query & Insight Extraction**

  Allow users to ask questions like "Summarize last week's precipitation trends for our Houston sites" and receive narrative overviews, key statistics, and recommended next steps.

- **Dynamic Visualization & Storyboarding**

  Automatically craft charts, heat maps, and annotated timelines to highlight anomalies, trends, and forecast uncertainties.

- **Embedded Commentary & Recommendations**

  Add AI-generated narrative insights while summarizing potential impacts on logistics, staffing, or asset protection, and suggest mitigation actions based on best practices.

Solution Approach

Minfy proposes a modern, cloud-native architecture to deliver a generative-AI-driven weather intelligence platform that is lightweight, scalable, and secure. We will leverage

minfy

AWS-managed services and infrastructure-as-code to accelerate delivery and ensure consistency across environments.

CEO

Foundation Components

Authentication & Authorization

o   AWS Cognito User Pools for user registration, authentication, and management, with built-in support for OAuth2 and OIDC flows.
o   Single Sign-On (SSO) enabled via Cognito's federated identity integrations (e.g., SAML, social providers, enterprise IdPs).
o   Role-Based Access Control enforced through Cognito groups and IAM roles, governing permissions for chat, report creation, and alert-rule management.

API Gateway

o   AWS API Gateway exposes the REST API endpoints for all frontend modules.
o   AWS Lambda functions for Chat Service, Reporting Service, Forecast API, and Admin APIs for scalable, serverless execution.

Data Storage

o   Amazon OpenSearch Service for semantically searchable indexes of weather datasets, metadata, forecasts, alerts, and historical records.
o   Amazon RDS (PostgreSQL) to persist chat transcripts, user session state, report request logs, and other relational data with ACID guarantees.
o   Amazon DynamoDB to store high-throughput conversational context, user-defined rules, and ancillary metadata for low-latency access.
o   Amazon S3 to store report artifacts like PDFs, Excel exports, chart images and raw data snapshots in a cost-effective, durable object store.

Portal UX & Module Integration

Unified Portal Shell

1.   Top-nav: "Chat" | "Reports" | "Alerts & Rules" | "Analytics"
2.   Consistent theming, branding, and user profile management

Chat Module

1.   Embedded in the portal's left panel or modal
2.   Context persists across navigations (e.g., jumping from chat to report preserves last query)

Reporting Module

1.   Interactive dashboard for ad-hoc report generation

AI-Powered Weather Chat

Natural Language Interface & Prompting Pipeline

Utilizes AWS Bedrock LLM endpoints (e.g., Anthropic Claude, Amazon Titan) combined with a Retrieval-Augmented Generation (RAG) layer. Incoming queries are run through a prompt manager that:

1. Retrieves relevant forecast data and metadata via OpenSearch.
2. Constructs a dynamic prompt (injection of user context, system instructions, and retrieved snippets).
3. Sends to the fine-tuned Bedrock model for precise intent classification, entity extraction, and narrative synthesis.

Dialog Manager & React Interface

1. Persists session data (locations, timeframes, subscription rules) in DynamoDB and RDS, enabling seamless multi-turn flows across both chat and reporting modules.

2. A modular widget built in React/TypeScript handles message rendering, input validation, and prompt dispatch. Contextual UI components (e.g., location pickers, date selectors) feed directly into the prompt pipeline.

Hybrid Retrieval & Generation

3. Query the Rest APIs and OpenSearch vector indices for numeric data, historical trends, and alert definitions.
4. Combine retrieved facts into prompts, then produce clear, actionable narratives using the LLM.
5. Render responses instantly in the chat widget

User Feedback Loop

1. Each response surfaces a thumbs up and down control.
2. Feedback is logged to the database for further analysis and prompt refinement.

Natural-Language Reporting Interface

Metadata-Driven Query Engine

1. Leverages your centralized metadata catalog (table schemas, relationships, data types) to inform an LLM prompt that dynamically constructs precise queries matching the user's request e.g., "Show me hourly precipitation and temperature variance for Site A last week."

Dynamic Chart & Insight Generation

1. Use Matplotlib routines to build time-series plots, bar charts, or geospatial heat maps based on the returned dataset.

2. Generate key statistics (means, anomalies, correlations) back into the LLM with a system prompt to generate narrative callouts like "Average wind speed spiked 20% above norm on July 15, likely due to…"

User Feedback Loop

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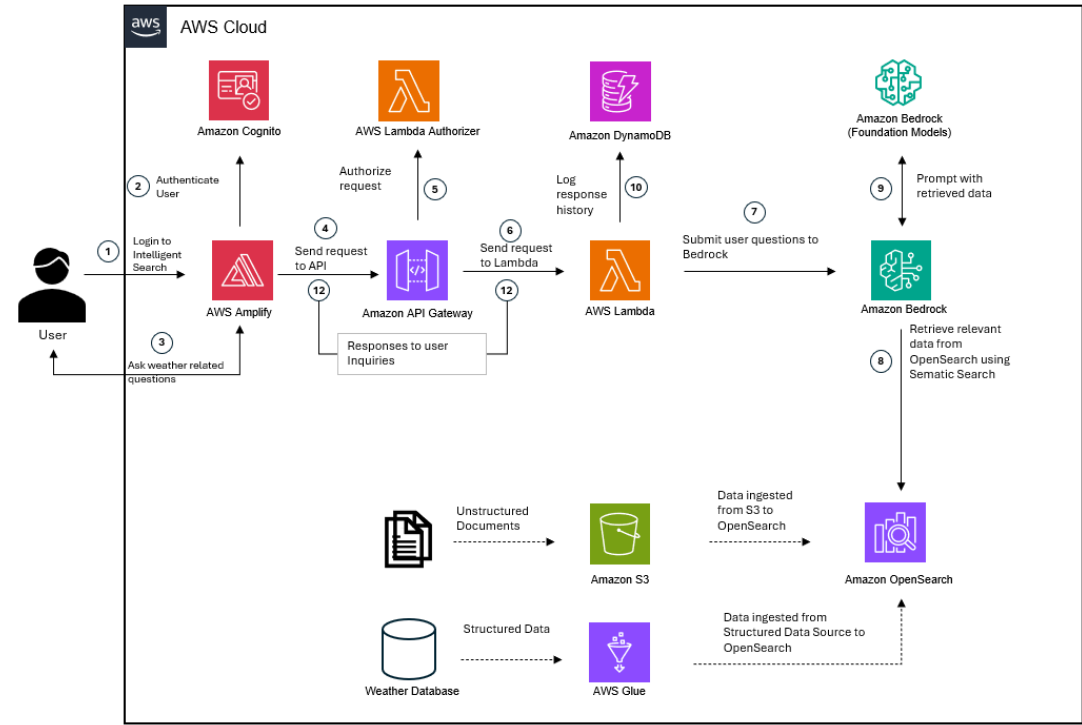

Figure 1: Proposed Architecture

Project Execution

Minfy will engage a hybrid delivery team (onshore, offshore, remote) that will utilize Agile methodologies, standard coding practices, proven technology and tooling, AWS/industry best practices to ensure rapid and responsive development tailored to NextWeather's project execution style. Delivery will involve iterative planning, daily standups, frequent collaborative reviews, feedback loops, and time-boxed feature releases.

Role	Name	Title	Contact Details

Executive Sponsor	Jaideep Sen	Chief Business Officer	jaideep@minfytech.com
Project Lead	Sahaya Bennet	Technical Project Manager	sahaya.bennet@minfytech.com
Escalation	Nikhil Polepally	Head of Engineering	nikhil.polepally@minfytech.com

Delivery Timeline

The project is expected to take 16 weeks to complete.

Phase	Week	Description
Project Initiation & Requirements Gathering	1 – 2	• Finalize project scope, success criteria, and stakeholder alignment. Establish governance, schedule kick-off meetings, and confirm resource availability. • Conduct workshops with stakeholders to define business requirements, user roles, subscription plans, and data usage expectations.
Platform Design & Planning **(Milestone 1)**	3 – 4	• Build wireframes and user journey flows. Align on catalog structure, subscription models, onboarding steps, and reporting needs. • Review delivery milestones, finalize backlog prioritization, and align on communication cadence for progress updates.
Build & Test **(Milestone 2)**	5 - 12	• Finalize system architecture and technology stack, create technical specs, set up Amazon services, develop and integrate frontend and backend services, build automation and CI/CD pipelines, conduct initial unit testing and integration testing
User Acceptance Testing	13 – 15	• Prepare test scenarios, user acceptance testing (UAT) plan, and review readiness criteria with business leads. • Business users validate the platform. Capture feedback, prioritize changes, and finalize sign-off for go-live.
Go-Live & Enablement **(Milestone 3)**	16	• Launch the platform. Conduct training sessions, finalize documentation, and communicate launch to end-users.
Hypercare & Support	17 – 18	• Provide daily business support, monitor platform usage, resolve early feedback, and ensure smooth user adoption.

Key Deliverables

- Project plan and scope document.
- System design and tech spec documents.
- Fully automated, deployed and accessible cloud infrastructure, frontend and backend systems in development, test, production environments.
- Application source code, scripts, and templates.
- Testing and QA reports.
- User manuals and training materials.
- Deployment and post-deployment support plan.

Pricing

There will be two components of cost for NextWeather.

1. A recurring monthly cost for consuming cloud and third-party services.
2. A one-time Minfy professional services cost to engineer and deliver the solution.

Professional Services and AWS

The total professional services fee for design, development, and deployment of the NextWeather platform will be finalized following internal budget alignment and ongoing discussions around potential AWS funding support.

As a Premier AWS Consulting Partner, Minfy is actively exploring available AWS funding programs to help subsidize this one-time cost (subject to AWS approval). Any portion not covered through AWS programs will be billed directly to the customer based on the final agreed scope.

Post Migration Support & Managed Services

Ongoing support and platform maintenance can be provided under a separate SLA. Services include:

- Infrastructure monitoring and incident response
- Feature enhancements and upgrades
- Data pipeline management and health checks

Partnering for What's Next

The NextWeather Platform marks a bold step toward a future where AI-powered, real-time weather intelligence becomes an integral part of how businesses and communities plan, operate, and respond. With NextWeather's visionary approach and Minfy's deep expertise in generative AI and cloud-native systems, this collaboration will redefine what's possible at the intersection of climate data, decision support, and digital transformation.

At Minfy, we are excited to embark on this journey together.

This Scope of Work ("SOW") is agreed to and accepted by the parties below. By signing, each party confirms their understanding of and commitment to the roles, responsibilities, and deliverables outlined herein.

NextWeather (Customer)	Minfy Technologies Inc.
Name: Craig Gilmore	**Name:** Nikhil Polepally
Title: CEO	**Title:** Head of Engineering
Signature:	**Signature:**