

Software and Tools Specification

Overview

This page details the software tools, libraries, frameworks, and platforms used for the development, deployment, and monitoring of the AutoSync Cloud Service. It includes a comprehensive list of dependencies, their purpose, and usage guidelines.

1. Development Tools

1.1 Programming Languages

Language	Version	Purpose
Node.js	18.x	Backend APIs, Microservices
Python	3.11.x	Data processing scripts
TypeScript	4.x	Frontend and Backend coding

1.2 IDEs and Code Editors

Tool	Usage
Visual Studio Code	Primary code editor with extensions for TypeScript, ESLint, and Docker.
PyCharm	For Python-based data pipelines.

2. Backend Frameworks and Libraries

Framework/Library	Version	Purpose
Express.js	4.x	RESTful API development.
Sequelize	6.x	ORM for PostgreSQL database interactions.
Passport.js	0.6.x	Authentication middleware.
Kafka.js	2.x	Integration with Kafka for event streaming.

3. Frontend Frameworks and Libraries

Framework/Library	Version	Purpose
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React.js	18.x	Building user interfaces for the admin portal.
Redux	8.x	State management in React applications.
Axios	1.x	API request handling.

4. DevOps Tools

4.1 Containerization and Orchestration

Tool	Version	Purpose
Docker	20.x	Containerization of all services.
Kubernetes	1.25.x	Orchestrating microservices deployment.
Helm	3.x	Kubernetes package management.

4.2 CI/CD

Tool	Purpose
GitHub Actions	Automated pipelines for testing and deployment.
ArgoCD	Continuous deployment for Kubernetes.

4.3 Infrastructure as Code

Tool	Purpose
Terraform	Infrastructure provisioning on AWS/GCP.

5. Monitoring and Logging

Tool	Version	Purpose
Prometheus	2.x	Metrics collection and monitoring.
Grafana	9.x	Visualizing metrics dashboards.
ELK Stack	Latest	Centralized logging (Elasticsearch, Logstash, Kibana).

6. Database and Storage

Tool/Technology	Version	Purpose
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PostgreSQL	14.x	Main relational database.
Redis	7.x	Caching layer for fast lookups.
MinIO	Latest	Local emulation for object storage.

7. Testing Frameworks

Framework/Tool	Version	Purpose
Jest	29.x	Unit testing for Node.js applications.
Cypress	12.x	End-to-end testing for frontend.
Supertest	Latest	API integration testing.

8. Security Tools

Tool	Purpose
OWASP ZAP	Vulnerability scanning for APIs and frontend.
Snyk	Dependency vulnerability checks.
HashiCorp Vault	Secrets management for Kubernetes deployments.

9. Deployment Specifications

Environment	Tools/Configurations
Local	Docker Compose, MinIO, Local PostgreSQL.
Staging	Kubernetes (GKE), Helm, GitHub Actions.
Production	Kubernetes (EKS), Prometheus, Grafana, ArgoCD.