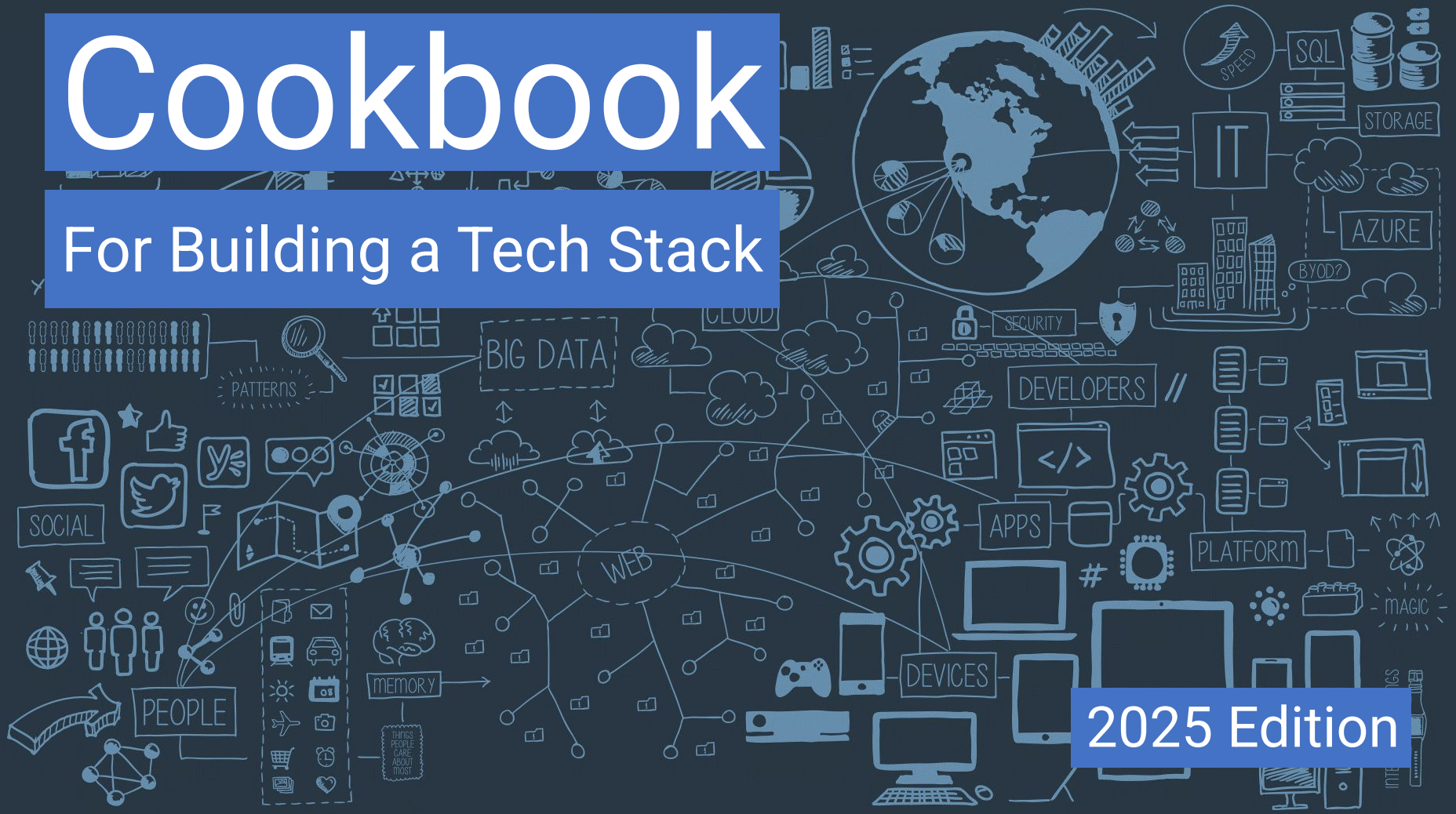
Cookbook

For Building a Tech Stack

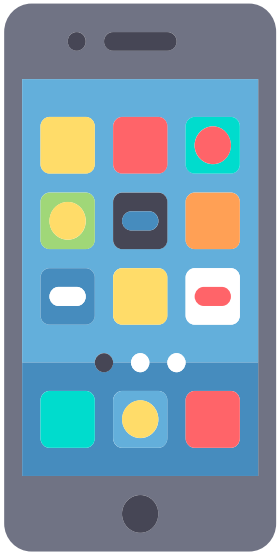


2025 Edition

Overview

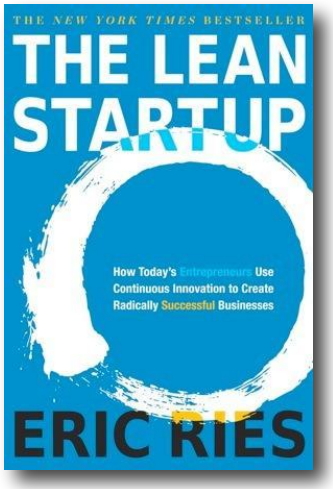
Slide	Topic
3	I Have This Great App Idea…
4	The Lean Startup
5-6	App Design Process
7-9	Frontend Architecture
10-18	Backend Architecture
19-20	Generative AI Architecture
21-24	Cloud Architecture Design Patterns
25-27	Monitoring
28-31	User Engagement
32-36	Other Items
37	Questions

I Have This Great App Idea…



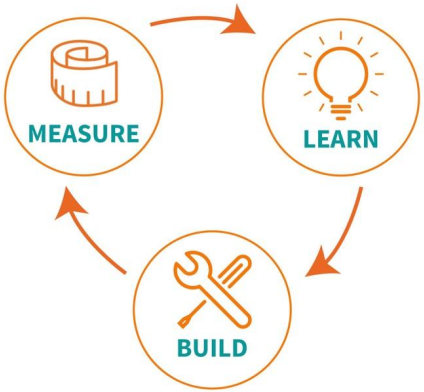
The deck will cover the technology options when going from an idea to building a tech stack. It’s meant for a non-technical audience.

The Lean Startup



[Wikipedia]

It's an approach for launching businesses and products, that relies on validated learning, scientific experimentation, and iterative product releases to shorten product development cycles, measure progress, and gain valuable customer feedback.



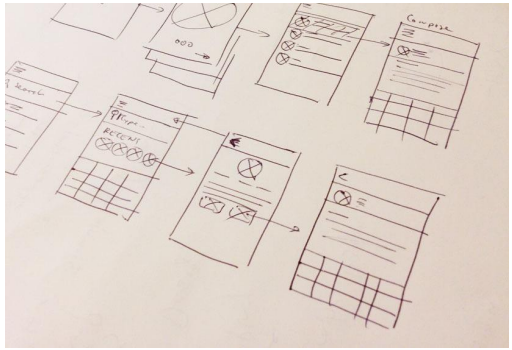
[The Reality]

It is THE industry bible for startups...READ IT.

App Design Process

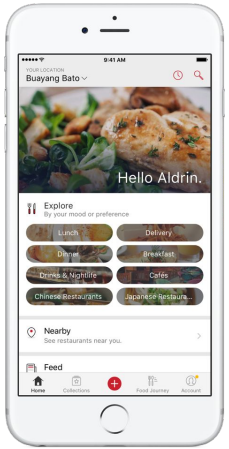
3 Step Process

1. Paper Prototype



2. Wireframes

3. Final Design



Adobe XD

Figma

Canva

Marvel

Sketch

Google App prototype design Google Search

Frontend Architecture

Mobile Phone Platforms

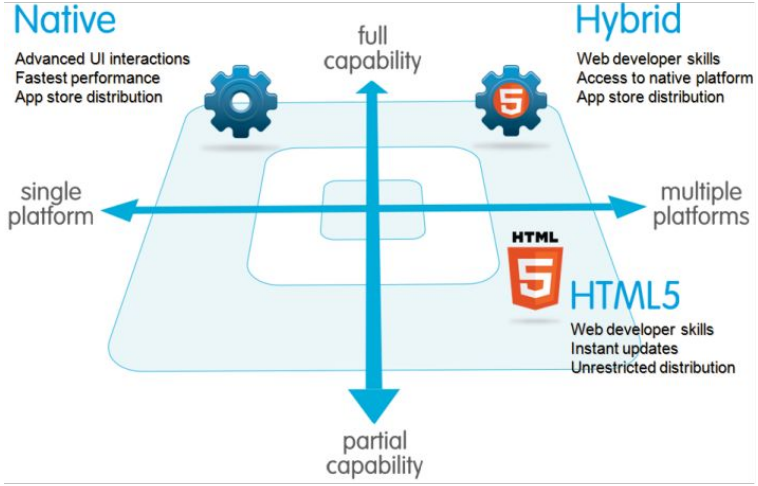
There are really only two major mobile platforms that are currently in use – Android and iOS.

In Asia, Android is more popular but the tastemakers and journalists tend to be on iOS. In the US and Europe you can get away with iOS initially then Android.

Development Options

Swift

Kotlin



Flutter

React Native

capacitor

Native development brings a much richer experience but lately the hybrid frameworks are gaining traction.

Backend Architecture

Cloud Provider

You will need a provider to host your servers, databases and other elements to run your app.

Options: Amazon Web Services (AWS), Google Cloud Platform, Microsoft Azure, Netmagic and Rackspace

Central vs. Distributed

The old way of designing the infrastructure for a backend was to put all the resources such as databases, files, images, etc... on the same server. The problem is if your database is slow and everything else is fine, you have to upgrade the entire server and disrupt the other functions. By distributing the resources you can quickly pinpoint the bottleneck and scale that particular resource.

Central

Computing, database, files, etc...

Distributed

Computing

Database

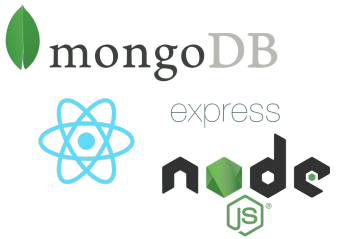
Static Files

Technology Stack

The “stack” refers to a set of software components needed to create a complete platform. For an app that includes the operating system, web server, database and programming language. The first 3 are “open-source”.

1 MEAN Stack

2 MERN Stack



3 LAMP Stack

4 Windows Stack

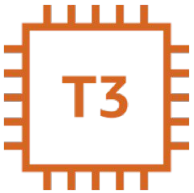
Open Source vs. Microsoft

mongoDB. express

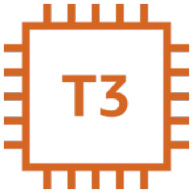
ANGULARJS node.js

Windows Server Microsoft IIS

Microsoft SQL Server Microsoft .NET



Server - m5.xlarge
$147 ($.202 per hour)



Server - m5.xlarge
$281 ($.386 per hour)

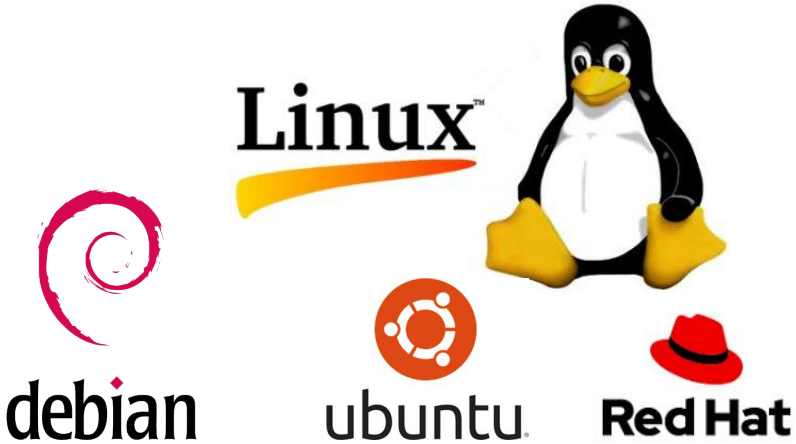
DB - Multi-AZ
m5.xlarge
$703 ($.964 per hour)

DB - Standard Multi-AZ
m5.xlarge
$2027 ($2.778 per hour)

AWS Mumbai Region (ap-south-1)
Prices as of January 2024

Operating System

There are only two options - Microsoft Windows or Linux. Windows is limited in the type of programming languages that you can run on the server. Linux is open source and has a large community that is continually improving the operating system. Within Linux, there are many “flavors” such as Debian, Ubuntu and Red Hat to choose from.



Web Server

Software that delivers information from the server to an app.

Options: Apache, Lighttpd, Microsoft Internet Information Server (IIS), Nginx, Node.js, Rails

Database

The heart of any app is the database since it stores all the user information, content and everything else related to the app. There are two categories to consider: Structured Query Language (SQL) or NoSQL.

Options: Amazon DynamoDB, Cassandra, CouchDB, MariaDB, Microsoft SQL, MongoDB, MySQL, Oracle, PostgreSQL

NoSQL

SQL

Programming Language

If you ask 4 programmers which is the best language, you will most likely get 5 different answers.

Options: Clojure, Golang, Java, JavaScript, Microsoft's .NET, Perl, PHP, Python, Ruby, TypeScript

Generative AI Architecture

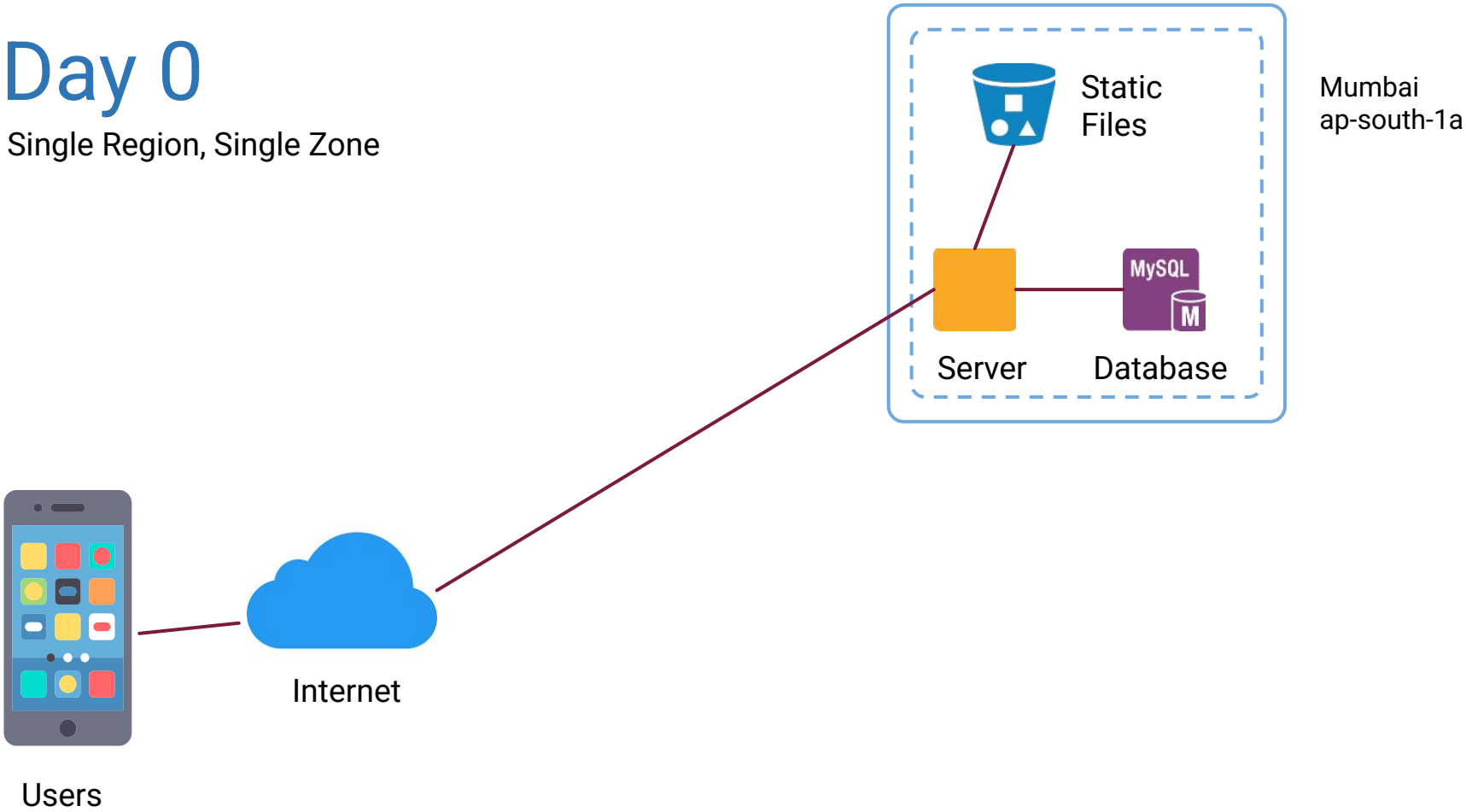
Generative AI Stack

Frontend	Vercel, NEXT.JS
Framework	LangChain, LlamaIndex, haystack by deepset
Database	PostgreSQL, Pinecone, Weaviate, milvus
Foundation Model	Gemma, OpenAI, Meta, ANTHROPIC, MISTRAL AI_
Cloud Provider & GPU	aws, NVIDIA, Google Cloud, AMD, Microsoft Azure

Cloud Architecture Design Patterns

Day 0

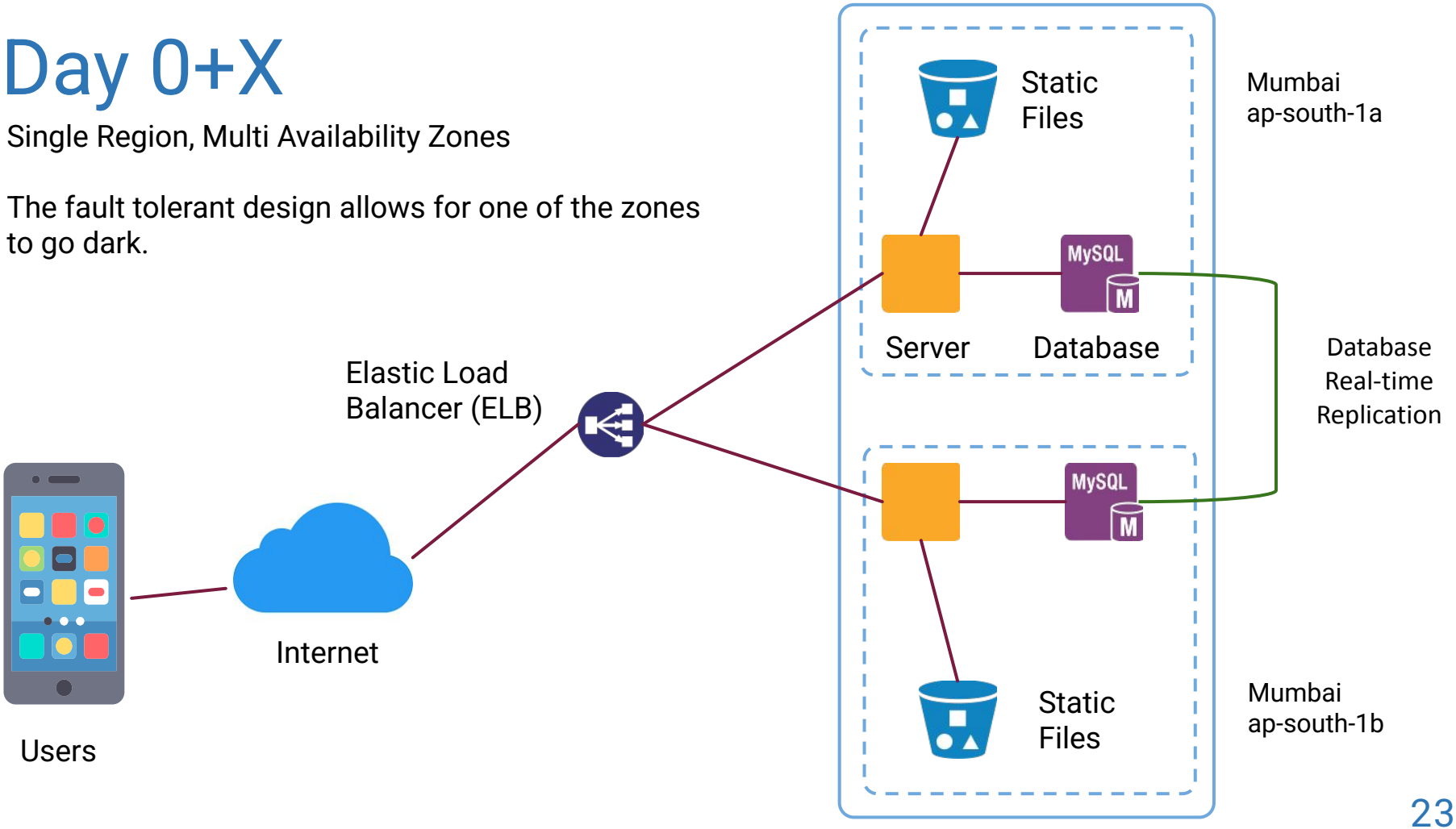
Single Region, Single Zone



Day 0+X

Single Region, Multi Availability Zones

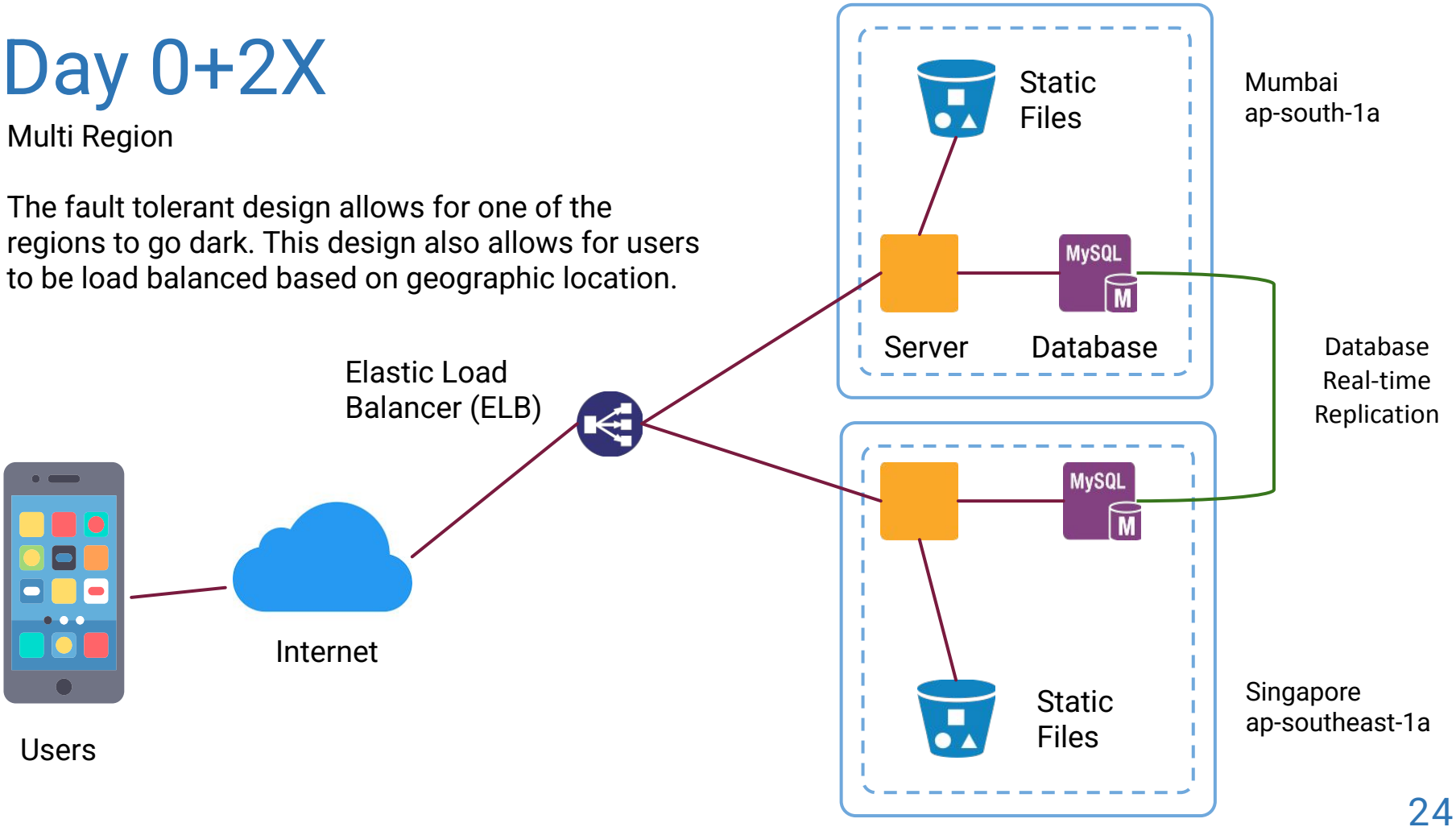
The fault tolerant design allows for one of the zones to go dark.



Day 0+2X

Multi Region

The fault tolerant design allows for one of the regions to go dark. This design also allows for users to be load balanced based on geographic location.

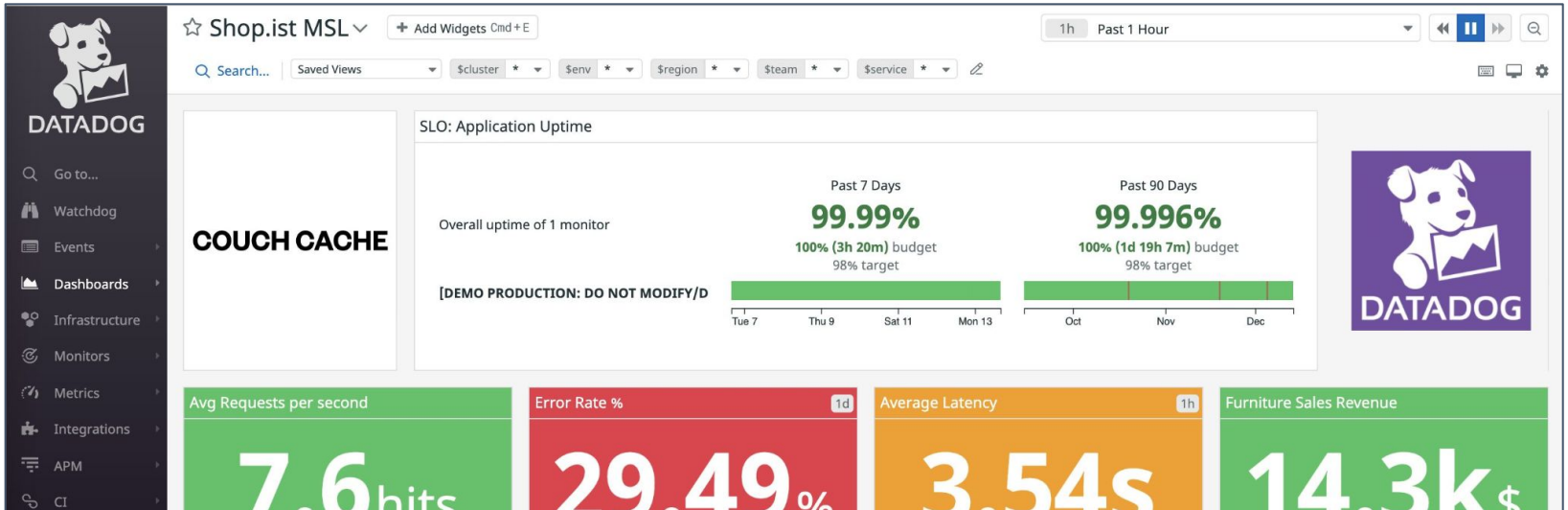


Monitoring

Observability

By monitoring the infrastructure, you can monitor if something breaks and also proactively plan if certain components need to be upgraded.

honeycomb.io SigNoz DATADOG Grafana dynatrace AppDynamics new relic Last9



Application Performance & Error Tracking

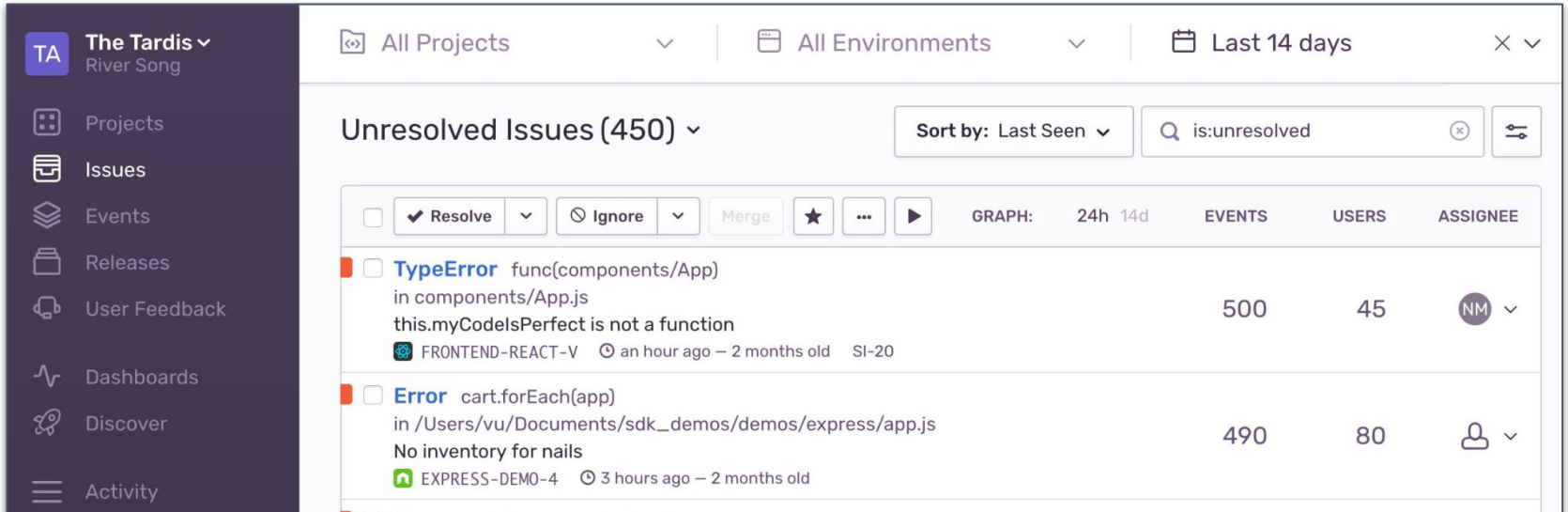
Monitor the performance of your application and also track errors that might be introduced when you deploy new features to the platform.

Sentry

SMARTBEAR BugSnag

Rollbar

LogRocket



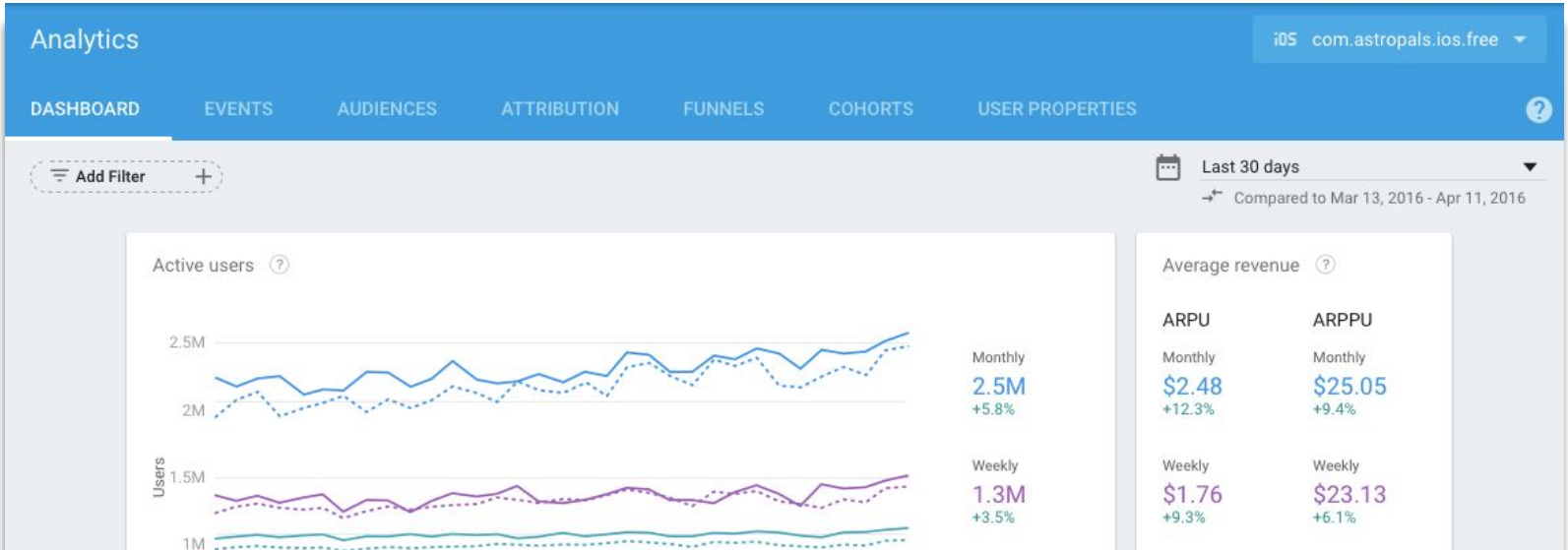
User Engagement

User Analytics

User Analytics allows you to see What your users are tapping, swiping, watching and buying? How often do they use your app and how long do they stay in the app?

AppsFlyer PageSense appsee Firebase

FLURRY mixpanel Google Analytics



Customer Engagement

A platform that optimizes every touchpoint throughout the customer journey to drive better outcomes for customers, throughout all their interactions with the app.

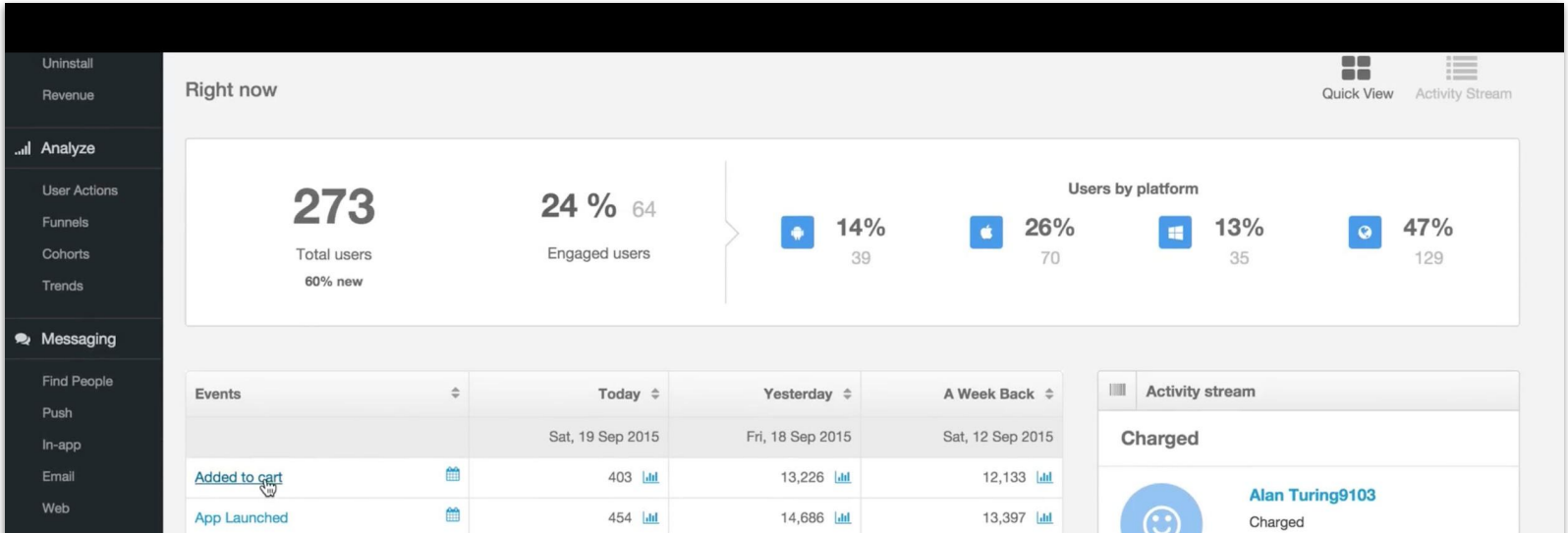
CleverTap

AMPLITUDE

INTERCOM

WebEngage

Adobe Analytics



Notifications

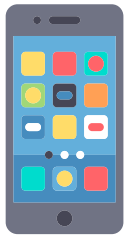
When users start to interact with the app, you will want to send them notifications such as a transaction has been completed or someone has liked their comment or a password reset link.

4 Options:

1. In-App. When the app is open and being used
2. Push. When the app is not being used, it will send a notification
3. E-mail
4. SMS

Other Items

Who Does What?



App

Cloud Provider

UI/UX Designer	Frontend Developer	Backend Developer	DevOps Engineer
Visually creates the user interface (UI) and the overall user experience (UX)	Converts the UI/UX design to Android, iOS and/or the Web	Converts the business logic into server code using JavaScript, PHP, Python, .NET, etc...	Manages the servers, databases, DNS information and other cloud infrastructure

Domain Name Registrar

You will need to register the domain name of your website such as SuperCars.com

Options: Cloudflare, Domain.com, GoDaddy, Name.com, and NameCheap

Data Privacy

Data privacy has become one of the biggest concerns globally and many countries have specific guidelines that websites and applications must adhere to. Below are several policies that your app might have to adhere to based on what target audience you are serving.

ISO27001

HIPAA

GDPR

CCPA

SOC 2

NEW: Digital Personal Data Protection Bill, 2023 (India)

Implementation Options

1. Build internally
2. Outsource
3. Hybrid - hire a technology lead

Building an app is like the Kama Sutra…there are many ways to accomplish “it”.

Questions?

Manish Jain

Co-Founder @ MProfit

mrjain@gmail.com
https://altamount.com

@mrjain

January 2025