## PrimerDB Data Architecture

**Overview:**

PrimerDB is a Django-based web application for designing, storing, searching, and managing DNA primers. It connects users to an SQLite database via a browser interface and uses external APIs (NCBI, gnomAD) for live data checks.

**Data Sources**

|  |  |  |
| --- | --- | --- |
| Data Source | Type | Usage |
| User Input | Forms | Register accounts, design primers, add primers |
| NCBI API | External | Pulls gene/genomic sequences |
| gnomAD | Local Copies | Fetches SNP (Single Nucleotide Polymorphism) data |
| Static Files | Local (RefSeqGenes37.txt / RefSeqGenes38.txt) | Maps gene names to locations |

**Database Schema**

|  |  |
| --- | --- |
| Table | Description |
| User | Built-in Django user model (accounts) |
| Primer | Individual primers |
| PrimerSet | Paired forward & reverse primers |
| PrimerArchive | Version history for single primers |
| PrimerSetArchive | Version history for primer sets |
| DesignTarget | Designed targets (gene or location) |
| PrimerDesign | In-process designed primers |
| Snp | SNPs linked to primers |
| Order, OrderNumber | (Legacy) Primer ordering system |
| Tag, TagSeq | Tags for primers |
| PcrSearch, PcrResult | In-silico PCR search results |

**Data Architecture Map**

A diagram of a computer software

AI-generated content may be incorrect.

**Figure 1:** Data Architecture Map for PrimerDB Application.

This diagram shows the PrimerDB application's data flow, where user actions (designing, uploading, or searching primers) trigger background processing tasks such as sequence lookup, SNP checking, validation, and storage into a local SQLite database, with reference data provided by static files and external sources. After processing, the validated and stored primer data is retrieved from the database via search queries or browsing functions and is presented back to the user through the web application interface.