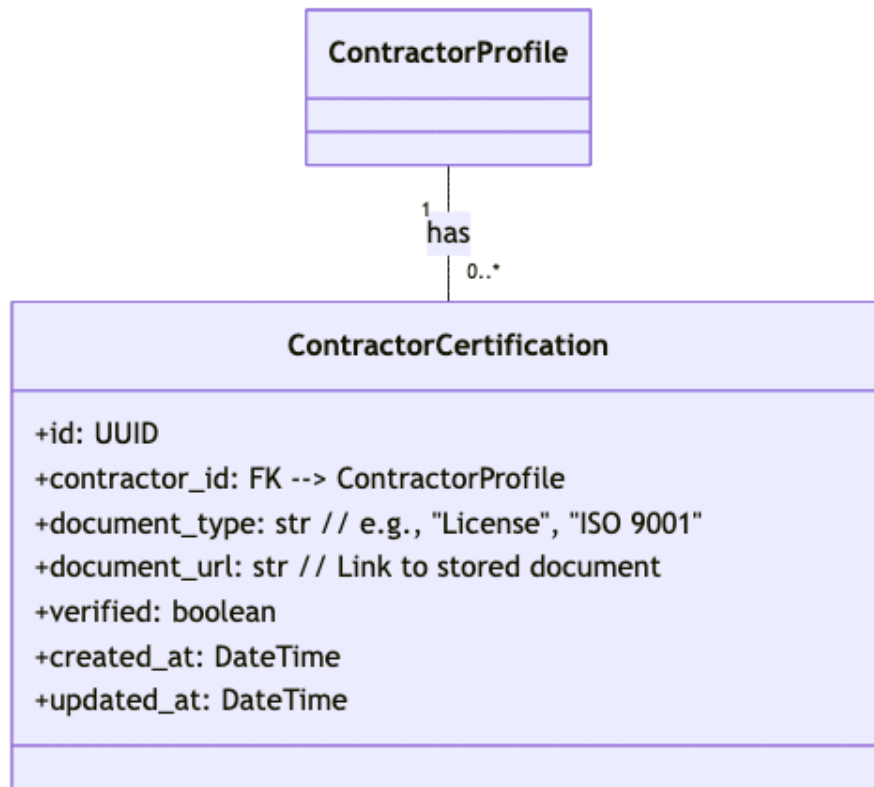## Phase 2: Contractor + Contracts Execution Layer

Overview: This phase expands the platform to include a marketplace for construction services and contracts. It introduces new user roles for contractors, mechanisms for posting tenders, bidding, and managing project execution through milestones. The schemas reflect the core entities required to facilitate service-based procurement.

Core Entities:

2.1. Contractor Profile (`contractors_contractor`) Represents a professional contractor or construction firm offering services on the platform. It extends the base `User` model with specific contractor details and performance metrics. This is distinct from `VendorProfile` for material suppliers.
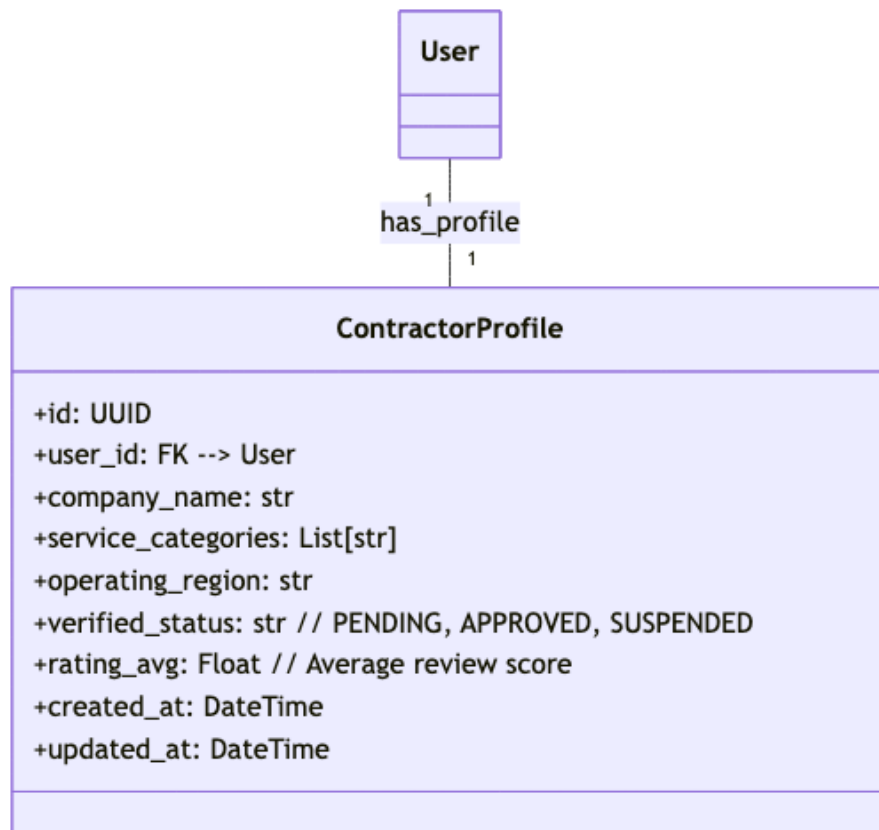
2.2. Contractor Certification (`contractors_certification`) Documents specific qualifications, licenses, or industry certifications held by a `ContractorProfile`, crucial for verification and establishing trust.

```
┌─────────────────────────┐
│    ContractorProfile    │
├─────────────────────────┤
│                         │
├─────────────────────────┤
│                         │
└─────────────────────────┘
              │ 1
             has
              │ 0..*
┌──────────────────────────────────────────────────┐
│              ContractorCertification               │
├──────────────────────────────────────────────────┤
│ +id: UUID                                          │
│ +contractor_id: FK --> ContractorProfile           │
│ +document_type: str // e.g., "License", "ISO 9001" │
│ +document_url: str // Link to stored document      │
│ +verified: boolean                                 │
│ +created_at: DateTime                              │
│ +updated_at: DateTime                              │
├──────────────────────────────────────────────────┤
│                                                    │
└──────────────────────────────────────────────────┘
```

2.3. Contract (`contracts_contract`) Represents a formal agreement or tender for construction services posted by a project owner. It outlines the scope of work, budget, timeline, and current execution status.

```
         ┌─────────────────┐
         │      User       │
         ├─────────────────┤
         │                 │
         ├─────────────────┤
         │                 │
         └─────────────────┘
                  │ 1
                 posts
                  │ 0..*
┌──────────────────────────────────────────────────────────────────────┐
│                              Contract                                  │
├──────────────────────────────────────────────────────────────────────┤
│ +id: UUID                                                              │
│ +owner_id: FK --> User // Project Owner                                │
│ +title: str                                                            │
│ +description_scope: TextField                                          │
│ +location: str                                                         │
│ +budget_min: Decimal                                                   │
│ +budget_max: Decimal                                                   │
│ +status: str // POSTED, BIDDING, AWARDED, IN_PROGRESS, COMPLETED, CANCELLED │
│ +created_at: DateTime                                                  │
│ +updated_at: DateTime                                                  │
├──────────────────────────────────────────────────────────────────────┤
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```
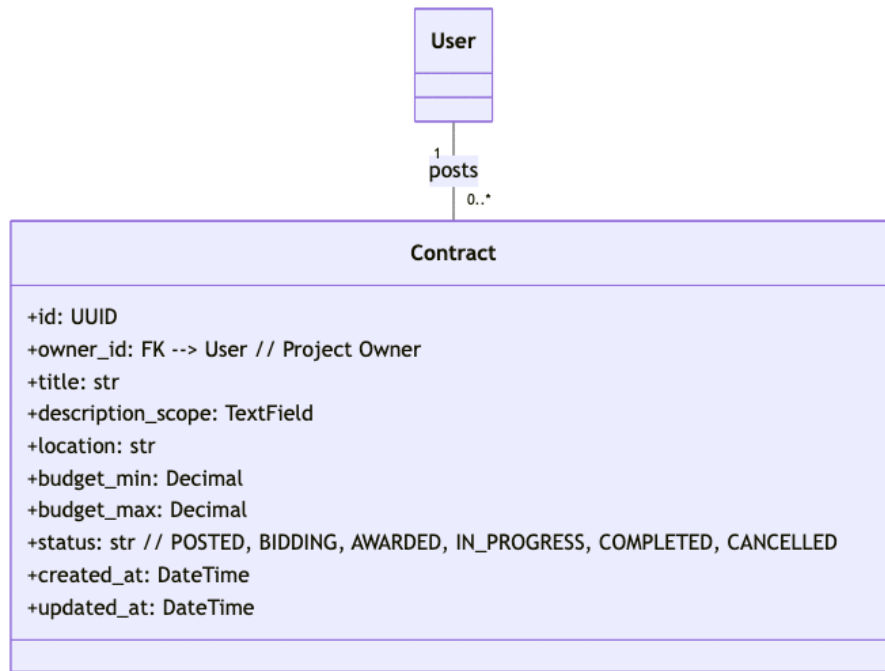
2.4. Bid (`contracts_bid`)   Captures a contractor's formal offer in response to a `Contract` (tender). It includes the proposed cost, timeline, and a message from the contractor.

```
     ┌─────────────┐          ┌──────────────────┐
     │  Contract   │          │ ContractorProfile│
     ├─────────────┤          ├──────────────────┤
     │             │          │                  │
     └─────────────┘          └──────────────────┘
           1│                        1│
        receives                  submits
             │0..*                      │0..*
┌──────────────────────────────────────────────────────────┐
│                          Bid                               │
├──────────────────────────────────────────────────────────┤
│ +id: UUID                                                  │
│ +contract_id: FK --> Contract                              │
│ +contractor_id: FK --> ContractorProfile                   │
│ +proposed_cost: Decimal                                    │
│ +proposed_timeline_days: Integer                           │
│ +message: TextField?                                       │
│ +status: str // SUBMITTED, SHORTLISTED, REJECTED, AWARDED  │
│ +created_at: DateTime                                      │
│ +updated_at: DateTime                                      │
├──────────────────────────────────────────────────────────┤
│                                                            │
└──────────────────────────────────────────────────────────┘
```
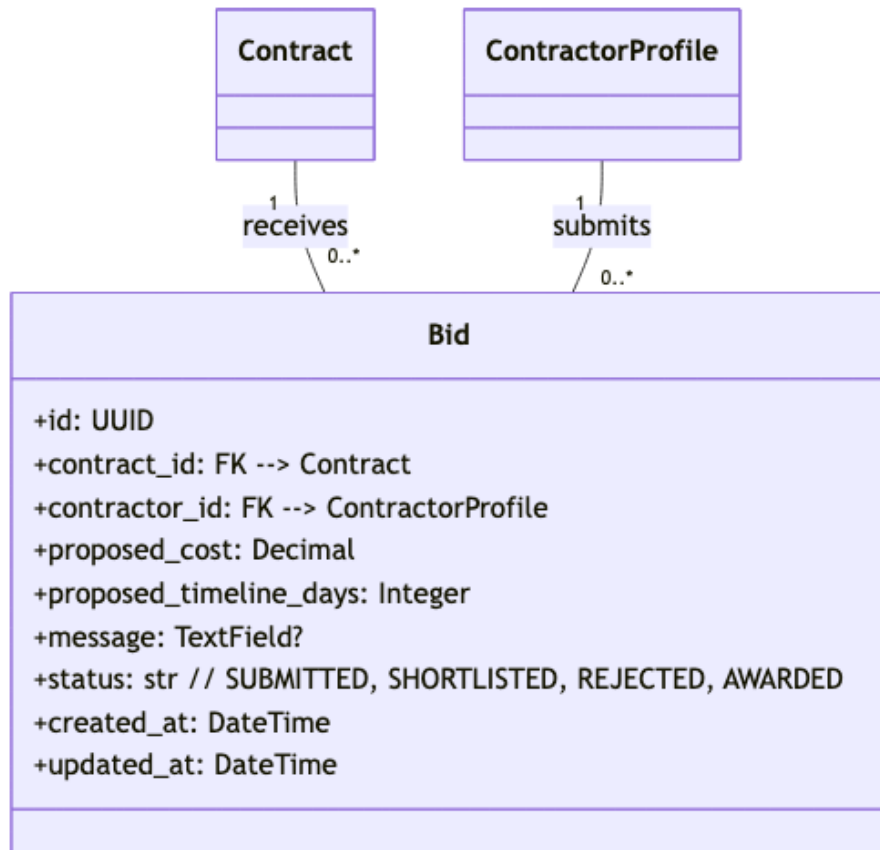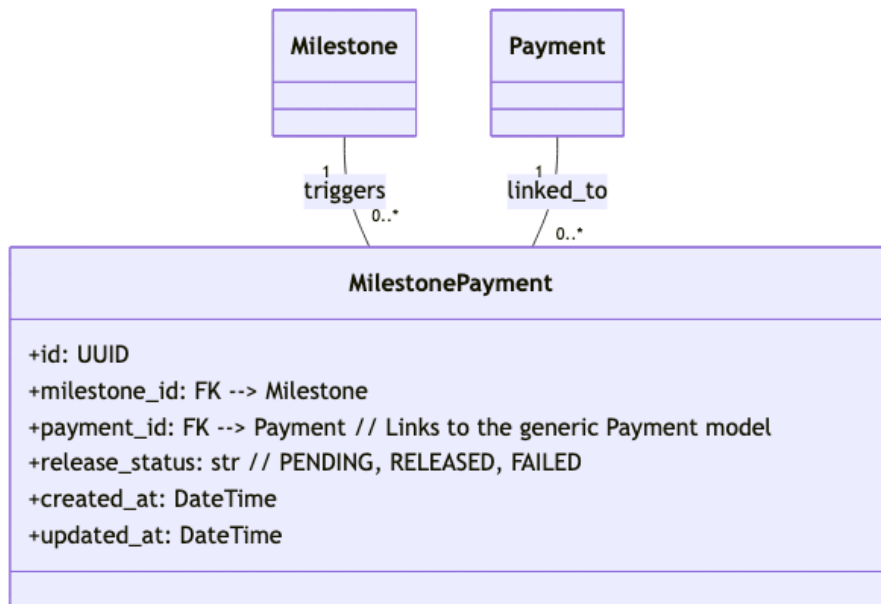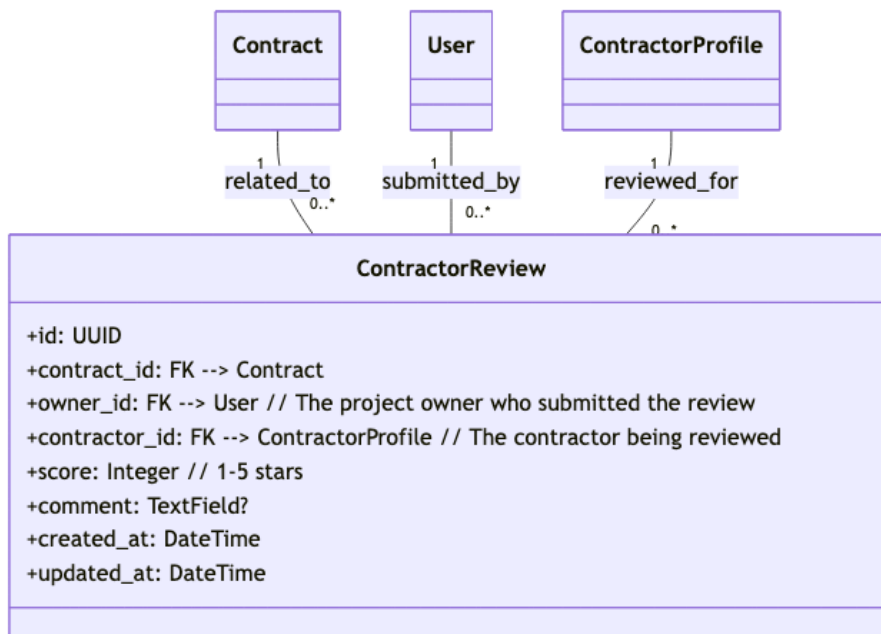
2.5. Milestone (`contracts_milestone`) Divides a `Contract` into smaller, manageable stages with defined deliverables, amounts, and due dates. Used for tracking progress and triggering payments.

```
┌─────────────────────┐
│      Contract       │
├─────────────────────┤
│                     │
├─────────────────────┤
│                     │
└─────────────────────┘
          1 │
      comprises
          0..*
```

Milestone

+id: UUID
+contract_id: FK --> Contract
+title: str
+description: TextField
+amount: Decimal
+due_date: Date
+status: str // PENDING, COMPLETED, APPROVED, PAID
+created_at: DateTime
+updated_at: DateTime
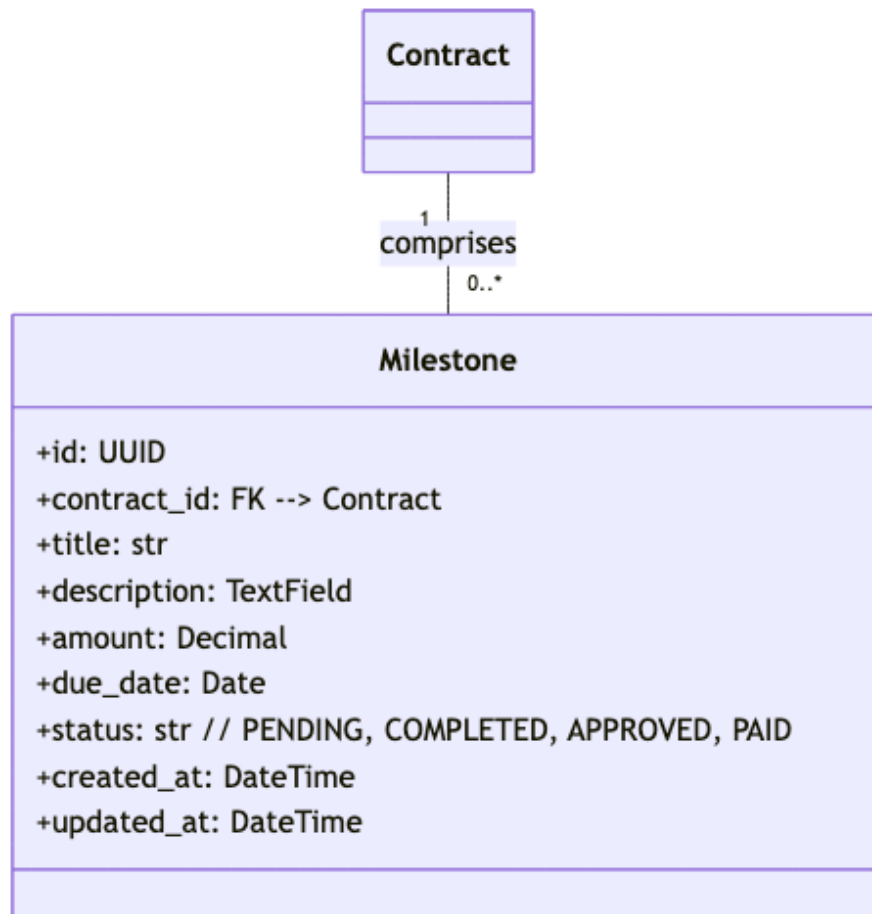
2.6. Milestone Payment (`payments_milestone_payment`) Links a specific `Milestone` completion to a payment record. In this phase, it signifies the initiation of a payment process upon milestone approval.

```
┌─────────────────┐   ┌─────────────────┐
│    Milestone    │   │     Payment     │
├─────────────────┤   ├─────────────────┤
│                 │   │                 │
├─────────────────┤   ├─────────────────┤
│                 │   │                 │
└─────────────────┘   └─────────────────┘
         1│                    1│
      triggers             linked_to
           0..*                   0..*
```

MilestonePayment

+id: UUID
+milestone_id: FK --> Milestone
+payment_id: FK --> Payment // Links to the generic Payment model
+release_status: str // PENDING, RELEASED, FAILED
+created_at: DateTime
+updated_at: DateTime

2.7. Contractor Review (`reviews_contractor_rating`) Allows project owners to provide feedback and ratings on a `ContractorProfile` after a `Contract` is completed, contributing to the contractor's reputation.

```
┌──────────────┐   ┌──────────┐   ┌────────────────────┐
│   Contract   │   │   User   │   │  ContractorProfile │
├──────────────┤   ├──────────┤   ├────────────────────┤
│              │   │          │   │                    │
├──────────────┤   ├──────────┤   ├────────────────────┤
│              │   │          │   │                    │
└──────────────┘   └──────────┘   └────────────────────┘
       1│                1│                  1│
   related_to       submitted_by       reviewed_for
        0..*              0..*                 0..*
```

ContractorReview

+id: UUID
+contract_id: FK --> Contract
+owner_id: FK --> User // The project owner who submitted the review
+contractor_id: FK --> ContractorProfile // The contractor being reviewed
+score: Integer // 1-5 stars
+comment: TextField?
+created_at: DateTime
+updated_at: DateTime