SQL QUERY LIFE CYCLE

TECH VAULT

AMR ELHELW

CRUD Operations

- **C** • CREATE / INSERT
- **R** • READ (SELECT)
- **U** • UPDATE
- **D** • DELETE

```sql
INSERT INTO employees (first_name, last_name, salary)
VALUES ('John', 'Doe', 60000);
```

```sql
SELECT first_name, last_name, salary
FROM employees
WHERE salary > 50000;
```

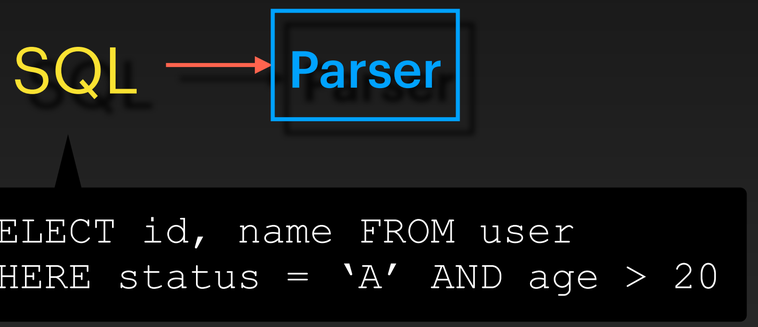
```sql
UPDATE employees
SET salary = salary * 1.1
WHERE salary < 50000;
```

```sql
DELETE FROM employees
WHERE employee_id = 123;
```

Amr Elbehiri's TECH VAULT

Query Engine

Amr Elhelw's
TECH
VAULT



Amr Elhelw's
TECH
VAULT

Parsing

```
SELECT name, phone FROM user WHERE status = 'active' AND agee > 20
```

Tokens

Keywords	SELECT - FROM - AND - OR - WHERE - NULL - NOT - IN - GROUP -...
Operations	> - < - = - <= - >= - + - ...
Other symbols	) - (- , (comma) - . (dot) - ...
Constant values	'Tom' - 16 - '02-04-2023' - ...
Identifiers	Anything else

Amr Elhelw's TECH VAULT

Syntax Checking

```
SELECT name, phone FROM user WHERE status = 'active AND agee > 20
```

Missing ‘

```
SELECT name, phone WHERE status = 'active' AND agee > 20
```

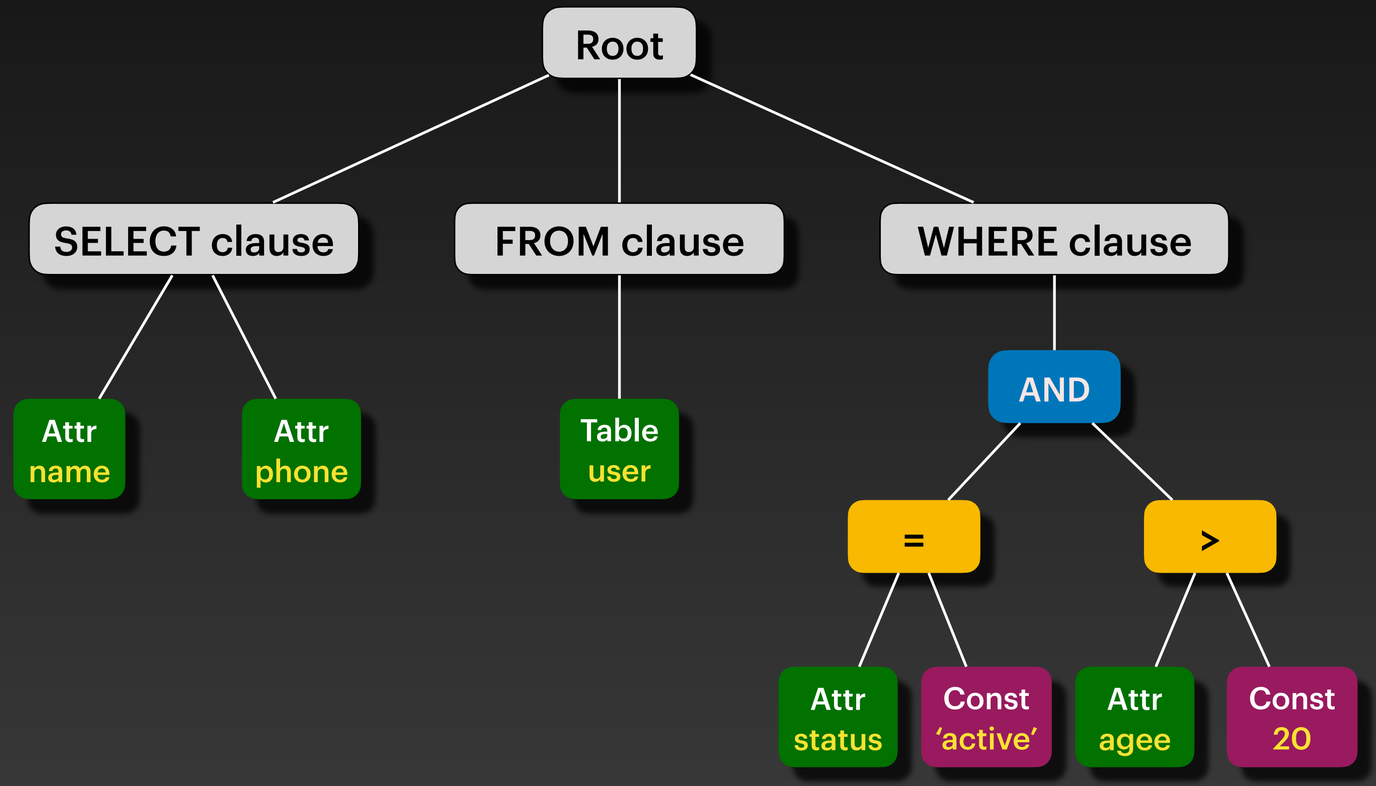
Missing FROM

Amr Elhelw's TECH VAULT

Parse Tree

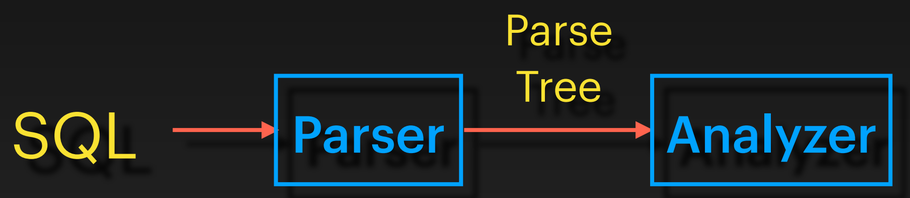
```
SELECT name, phone FROM user WHERE status = 'active' AND agee > 20
```

SELECT | Ident name | , | Ident phone | FROM | Ident user | WHERE | Ident status | = | Const 'active' | AND | Ident agee | > | Const 20



Amr Elhelw's TECH VAULT

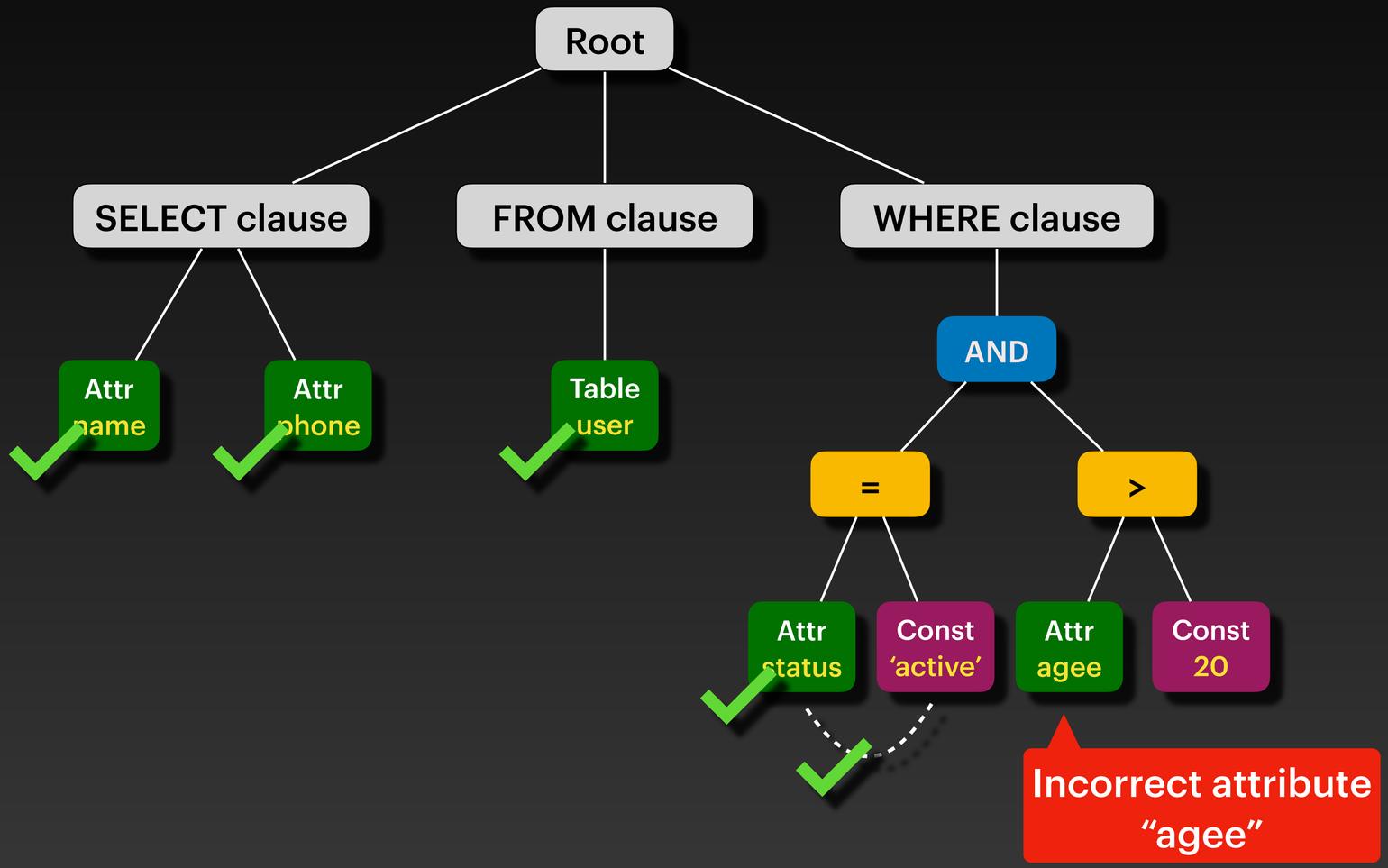
Query Engine



Amr Elhelw's
TECH
VAULT

Query Analysis

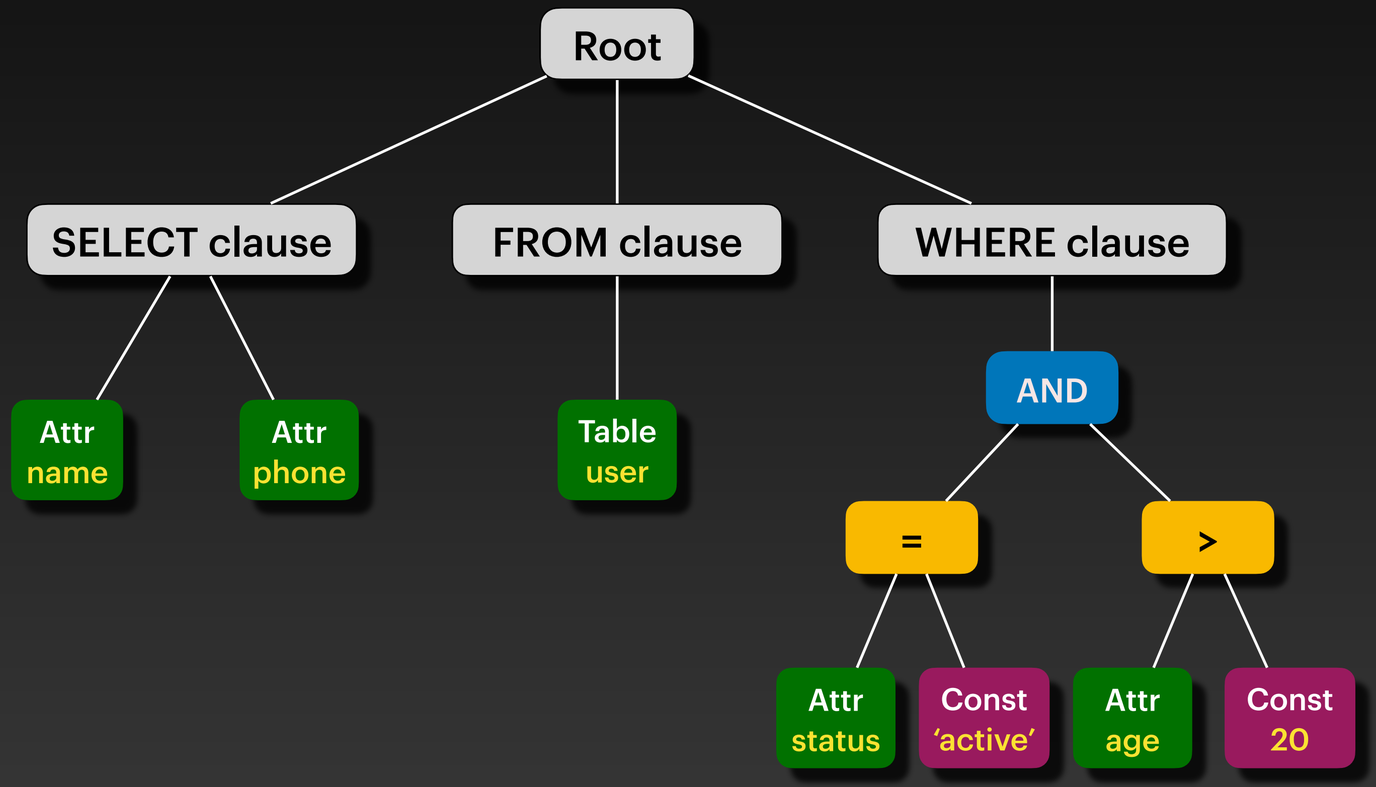
Parse Tree



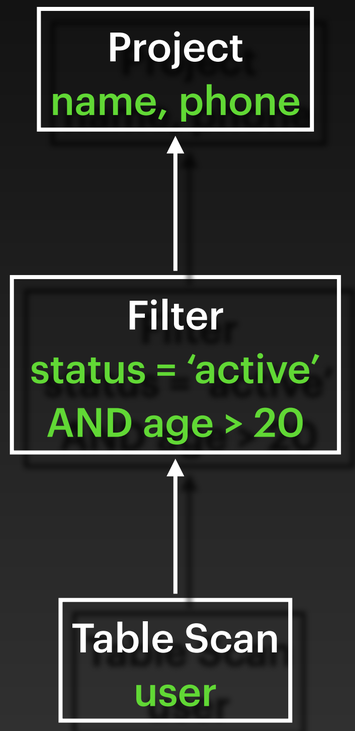
Amr Elhelw's TECH VAULT

Query Analysis

Parse Tree

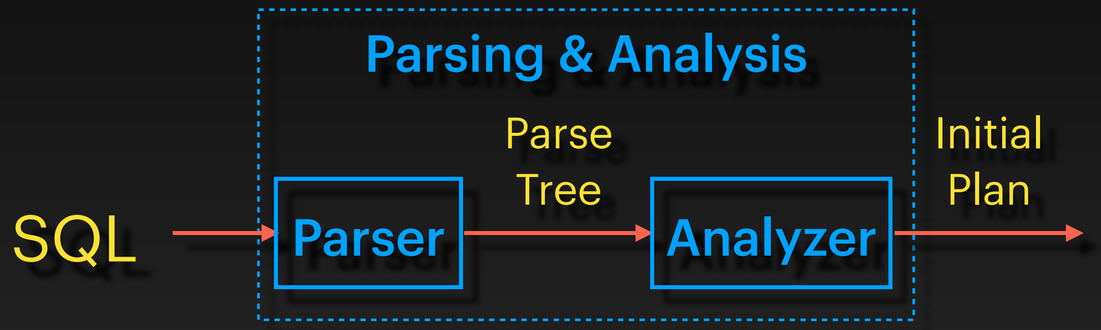


Initial Query Plan



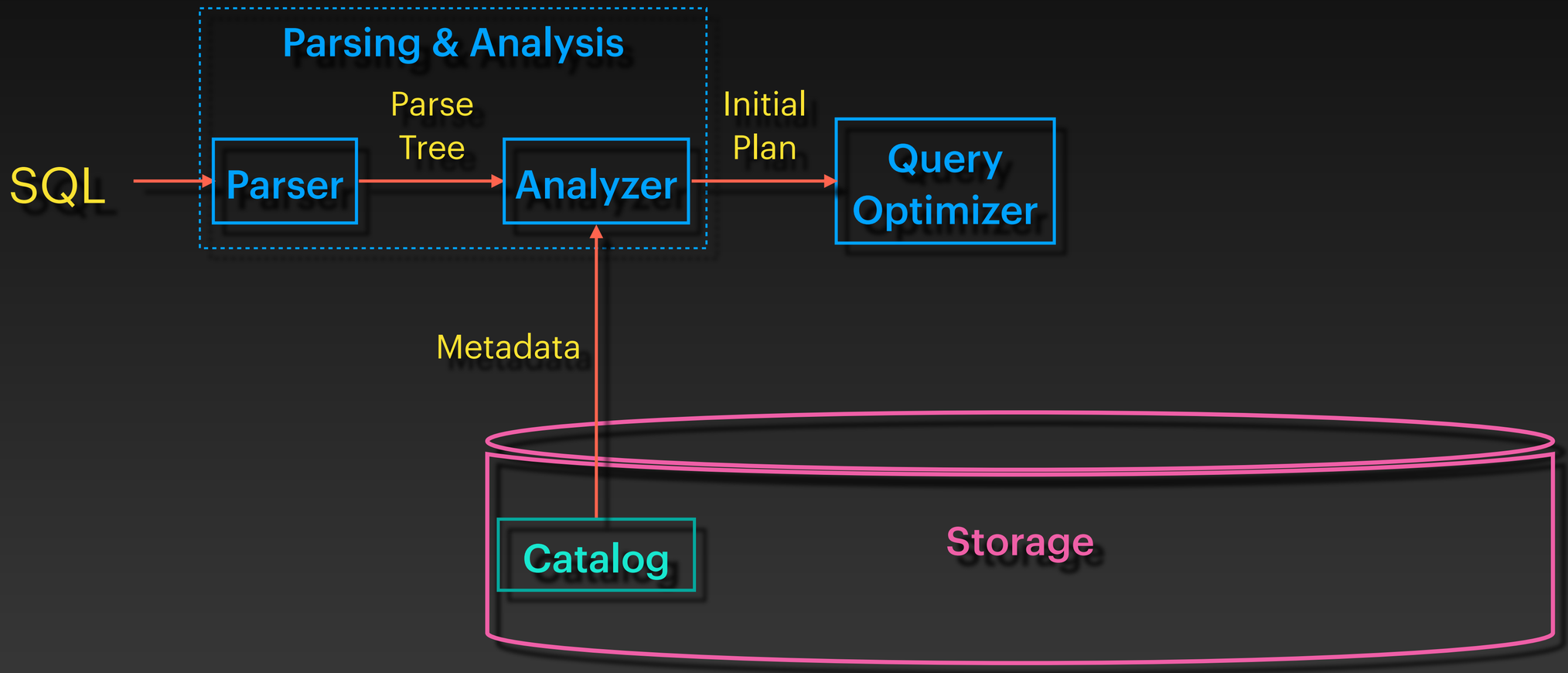
Amr Elhelw's
TECH
VAULT

Query Engine



Amr Elhelw's
TECH
VAULT

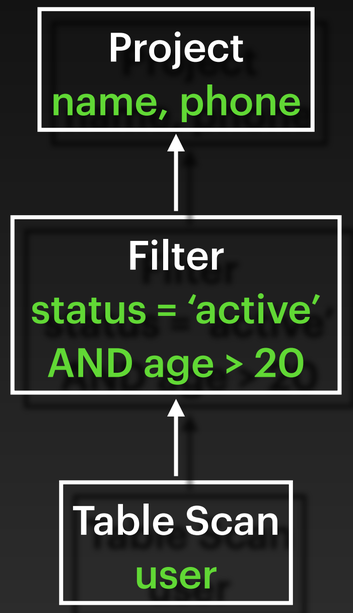
Query Engine



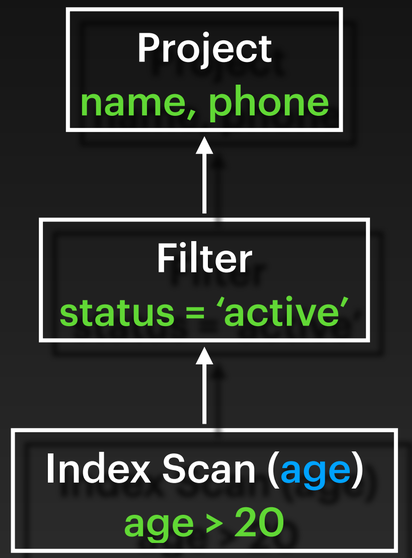
Amr Elhelw's TECH VAULT

Query Optimizer

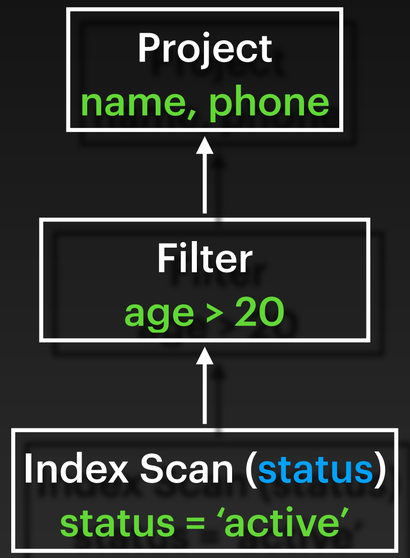
Plan 1



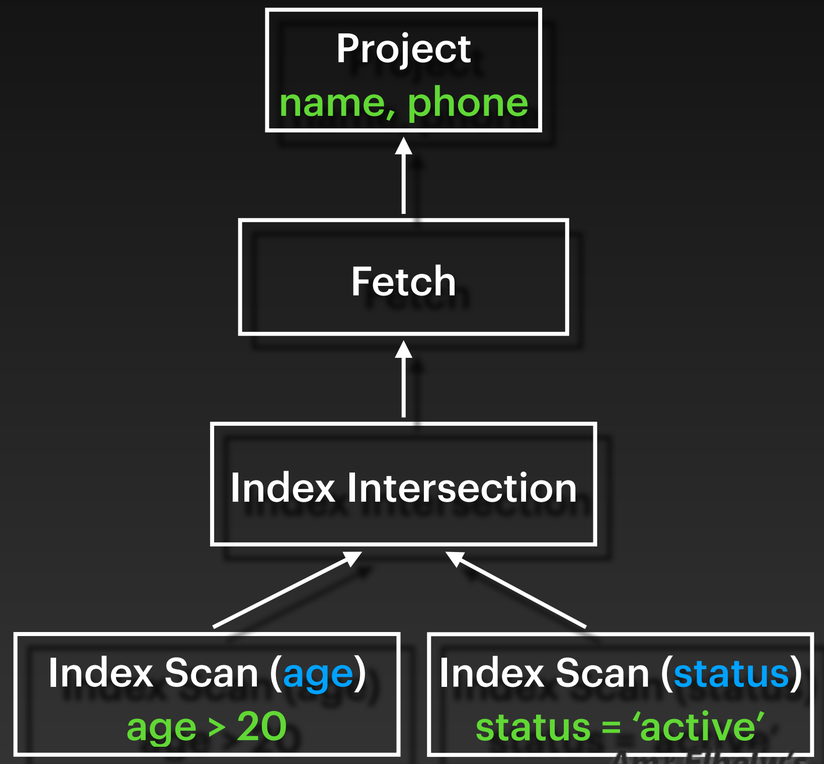
Plan 2



Plan 3



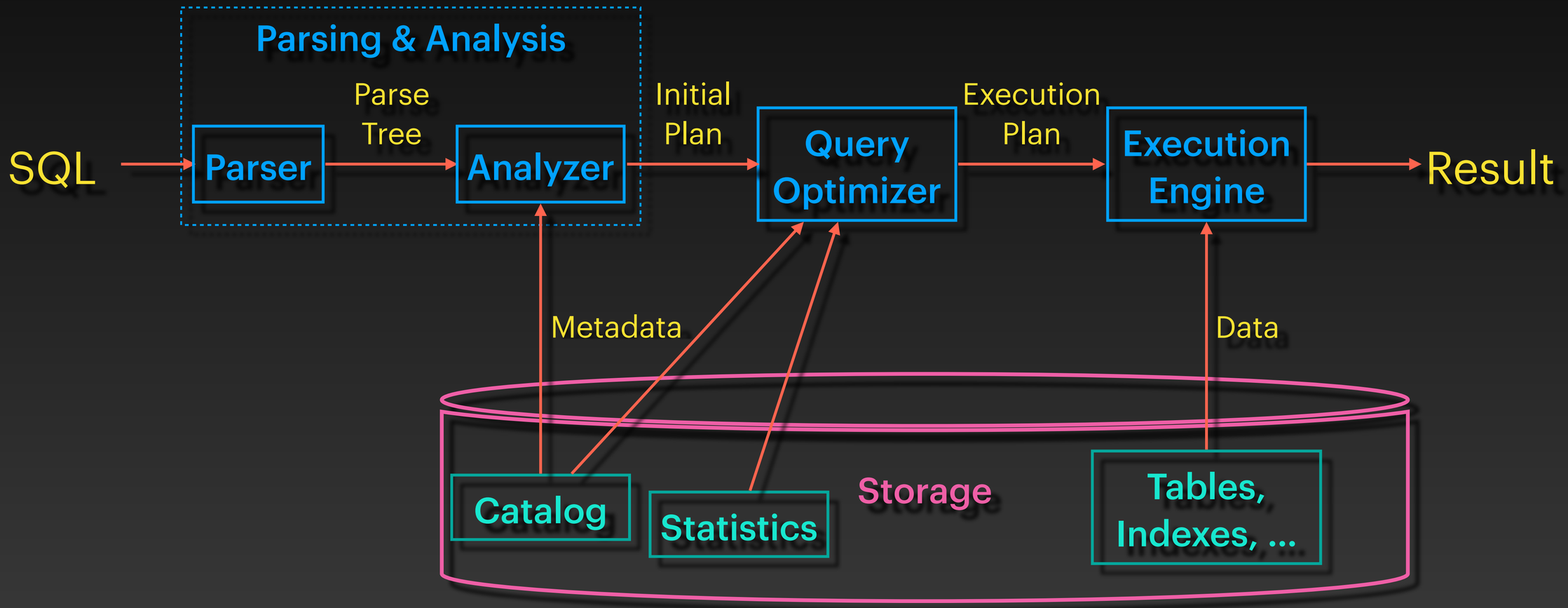
Plan 4



Indexes:
Index on (age)
Index on (status)

Amr Elhelw's
TECH
VAULT

Query Engine



Amr Elhelw's TECH VAULT