Data Modeling A Scheduling Application

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Who am I & What do we do?

Adam Hutson

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DataStax MVP for Apache Cassandra

DataScale provides hosted data platforms as a service

Offering Cassandra & Spark, with more to come

Currently hosted in Amazon & Azure

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Data Modeling Stages

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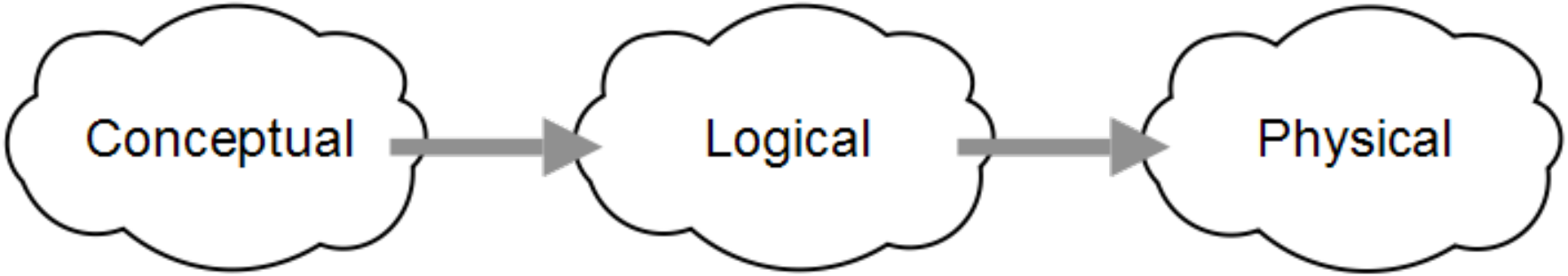
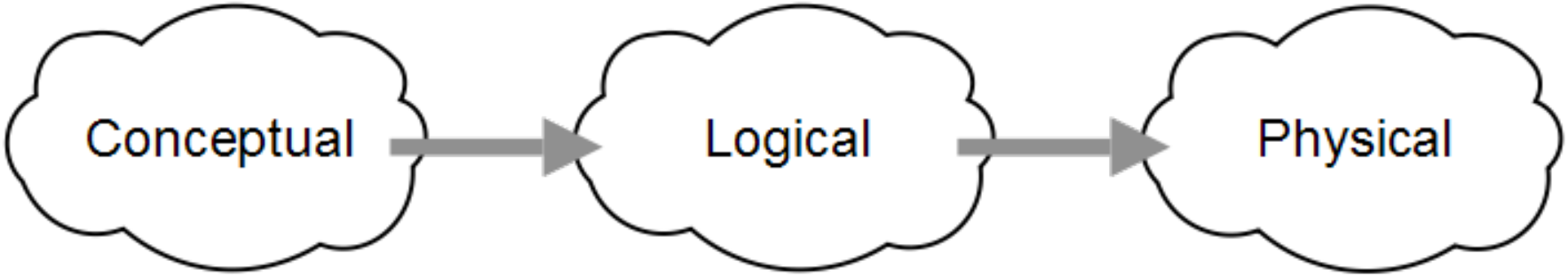
Data Modeling Stages



- Maps concepts, relationships, & constraints
- Consists of entity classes with characteristic attributes
- Nothing to do with a database

Data Modeling Stages



- Maps concepts, relationships, & constraints
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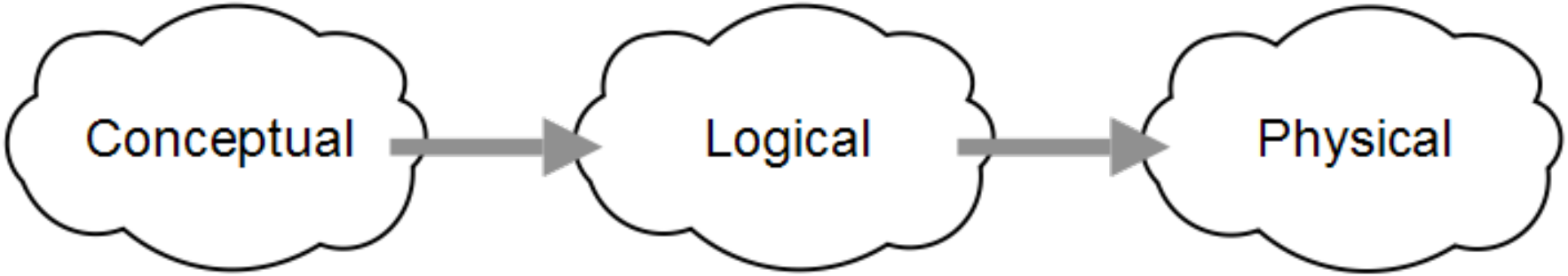
- Nothing to do with a database

- Entities become tables
- Attributes become columns/ fields
- Relationships become key
- Entity Relationship Diagram

Data Modeling Stages

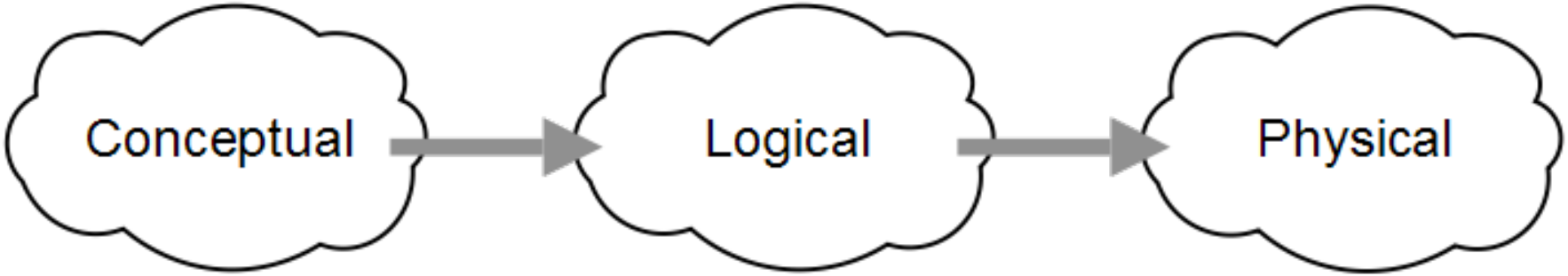


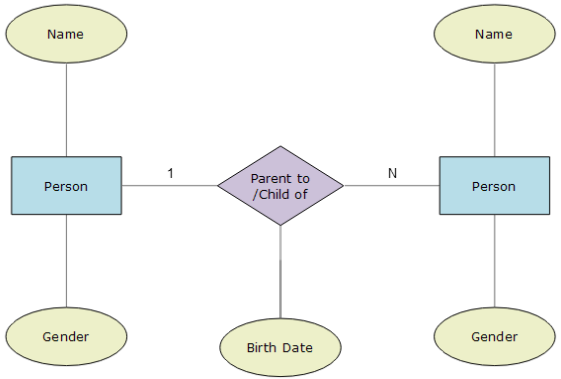
- Maps concepts, relationships, & constraints
- Consists of entity classes with characteristic attributes
- Nothing to do with a database

- Entities become tables
- Attributes become columns/ fields
- Relationships become key
- Entity Relationship Diagram

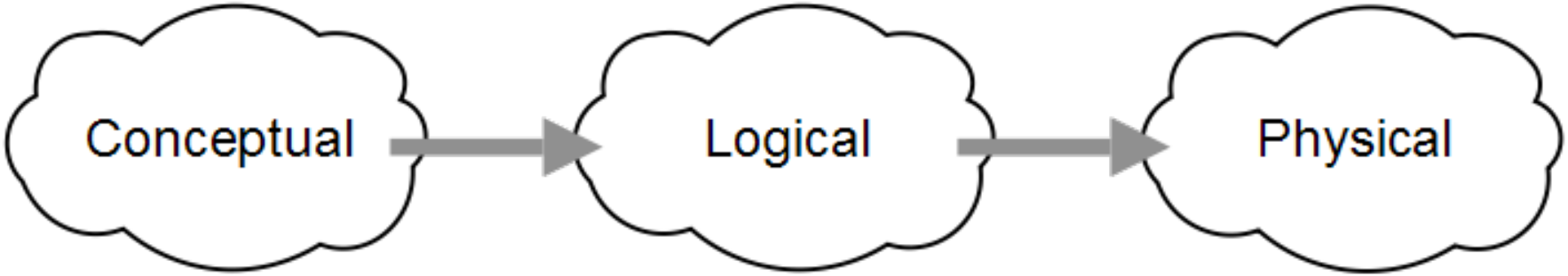
- Applies constraints of chosen database
- Table structure using syntax
- Data types, keys, relationships

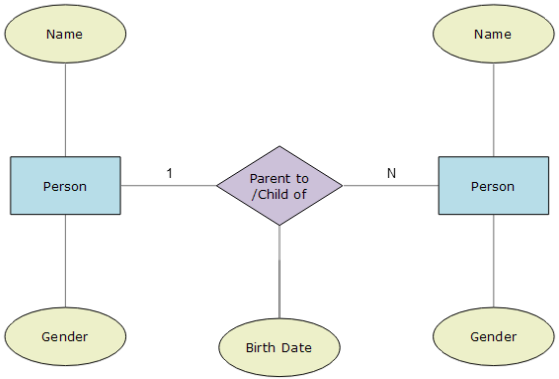
Data Modeling Stages

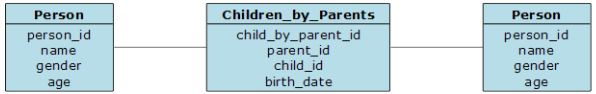




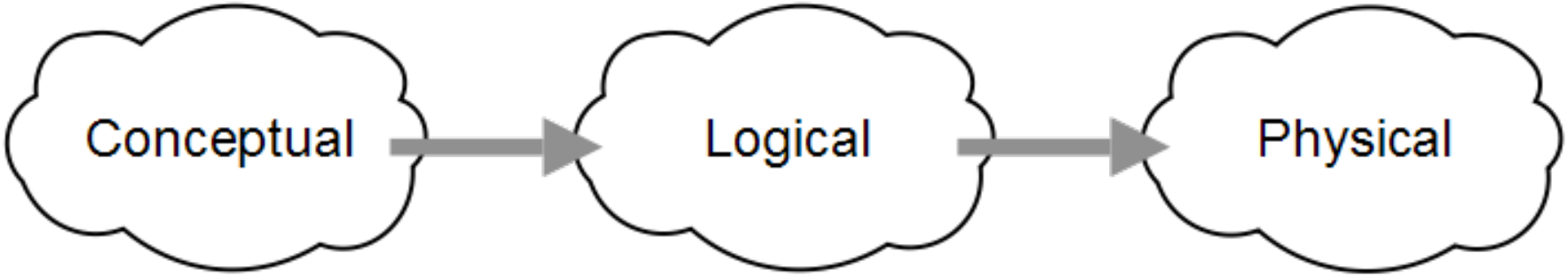
Data Modeling Stages

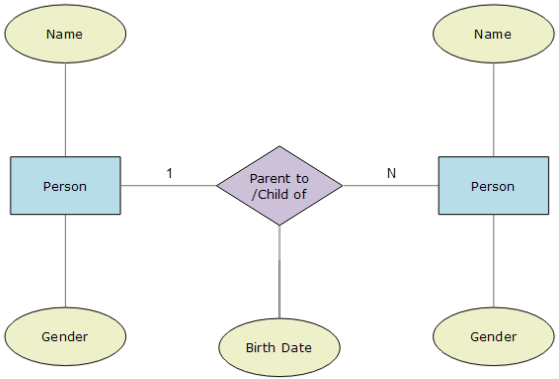


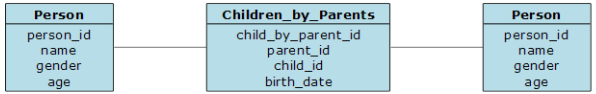




Data Modeling Stages








```
CREATE TABLE person (
    person_id uuid PRIMARY KEY,
    age int,
    gender text,
    name text
);
```

```
CREATE TABLE children_by_parent (
    parent_id uuid,
    child_id uuid,
    parent_name text,
    parent_age int,
    parent_gender text,
    child_name text,
    child_age int,
    child_gender text,
    PRIMARY KEY (parent_id, child_id)
) WITH CLUSTERING ORDER BY (child_id ASC);
```

Scheduling Application

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Scheduling Application Definition

What is it?

Application to schedule service appointments.

Who is it for?

Any employee of the service company.

What does it do?

Sets & retrieves appointments for service.

Client/Service detail requests.

Provider/Service detail requests.

Services delivered/scheduled over time.

Conceptual Model

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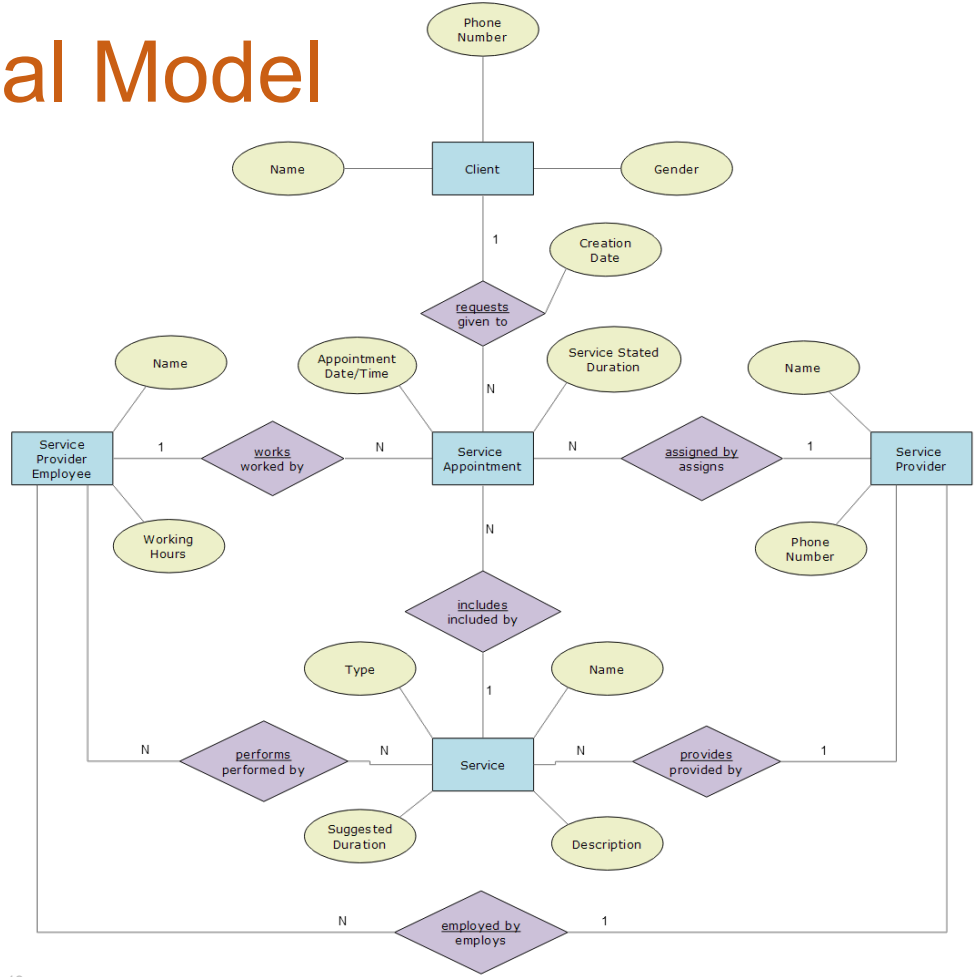
Conceptual Model



Logical Model

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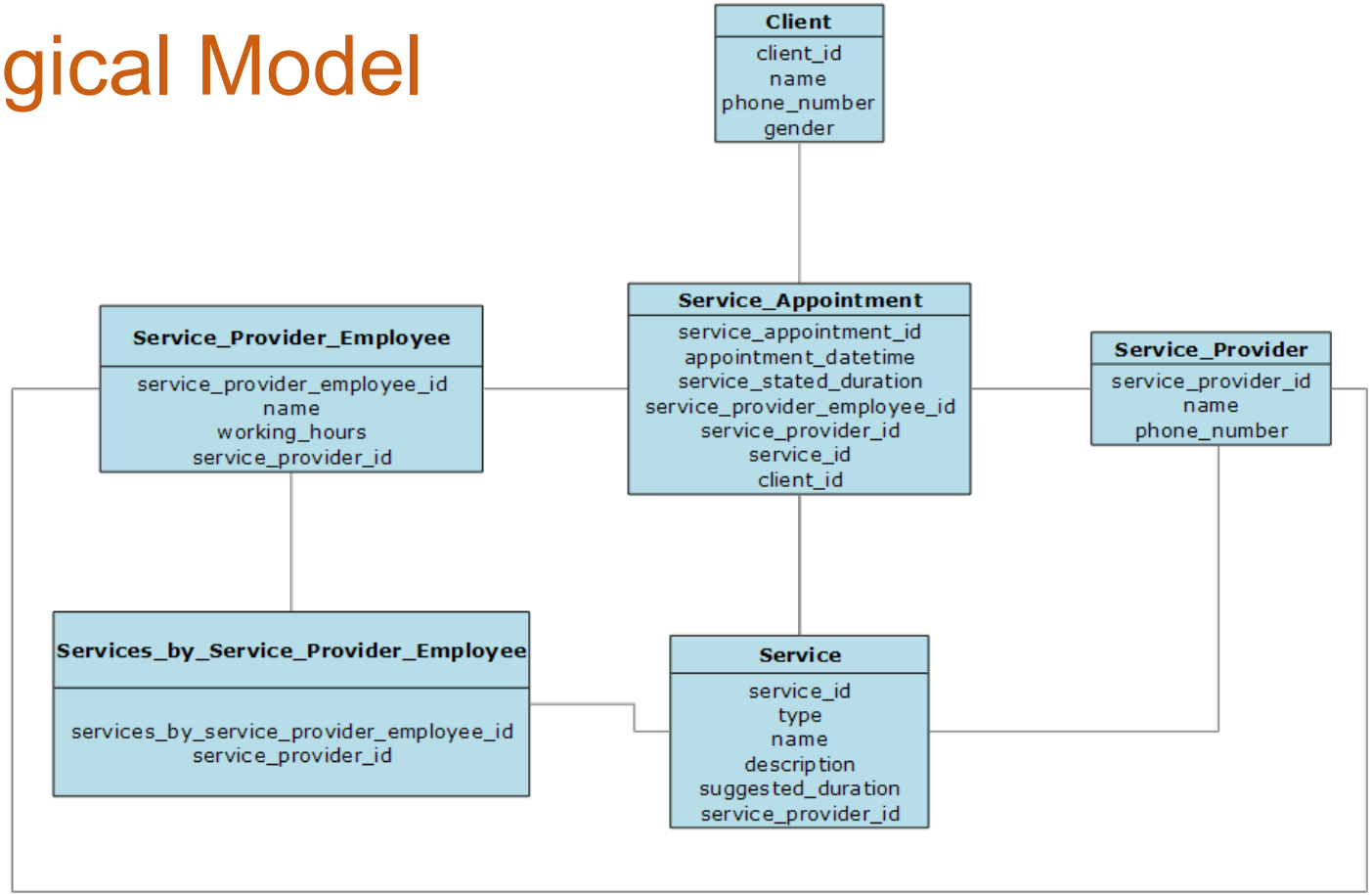
Logical Model



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Desired Queries

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Desired Queries

- Add new client information
- Get client info by name or phone
- Create appointment for specific date/time, client, service, & service technician
- Get all scheduled appointments for specified client name or phone
- Get all available times to schedule appointment for specified service & service technician
- Get all scheduled appointments for specified service technician

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Physical Model

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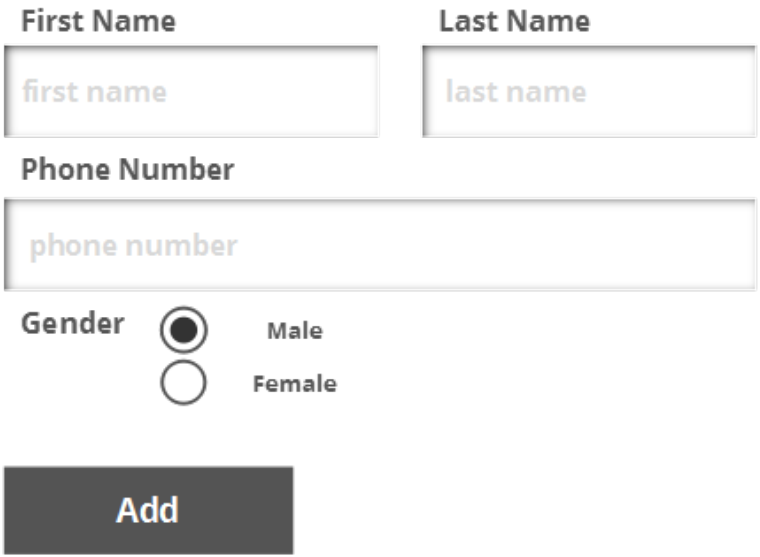
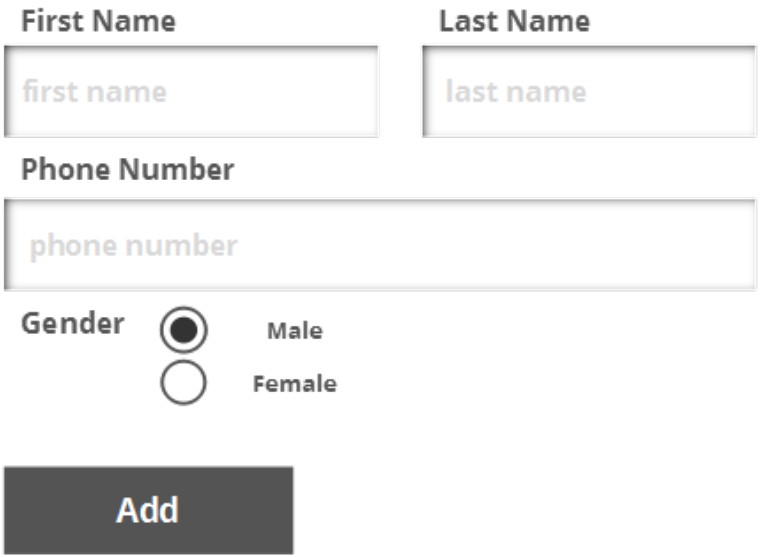
Physical Model

Add new client information



Physical Model

Add new client information




```
CREATE TABLE client (
    client_id uuid PRIMARY KEY,
    gender text,
    name text,
    phone_number text
);
```

Physical Model

Get client info by name or phone

Name	Gender	Phone Number
------	------	------
------	------	------
------	------	------

Physical Model

Get client info by name or phone

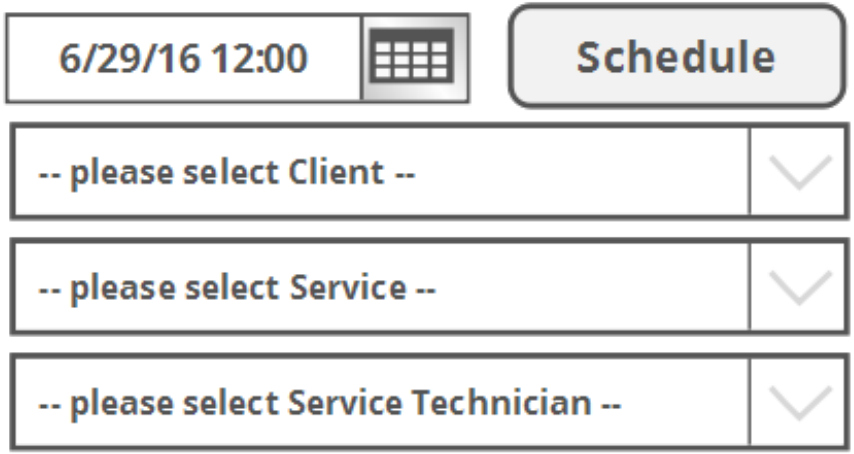
Name	Gender	Phone Number
------	------	------
------	------	------
------	------	------

```
CREATE TABLE client_by_name (
    name text,
    client_id uuid,
    phone_number text,
    gender text,
    PRIMARY KEY (name, client_id)
) WITH CLUSTERING ORDER BY (client_id ASC);
```

```
CREATE TABLE client_by_phone_number (
    phone_number text,
    client_id uuid,
    name text,
    gender text,
    PRIMARY KEY (phone_number, client_id)
) WITH CLUSTERING ORDER BY (client_id ASC);
```

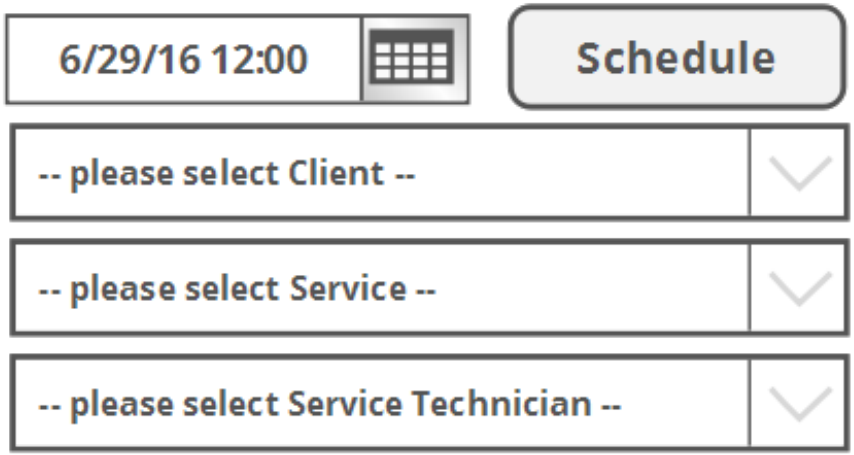
Physical Model

Create appointment for specific date/time, client, service, & service technician



Physical Model

Create appointment for specific date/time, client, service, & service technician




```
CREATE TABLE service_appointment (
    service_appointment_id uuid PRIMARY KEY,
    appointment_datetime timestamp,
    client_id uuid,
    service_id uuid,
    service_provider_employee_id uuid,
    service_provider_id uuid,
    service_stated_duration int
);
```

Physical Model

Get all scheduled appointments for specified client name or phone

Name	Phone Number	Appt Date	Service
------	------	------	------
------	------	------	------
------	------	------	------

Physical Model

Get all scheduled appointments for specified client name or phone

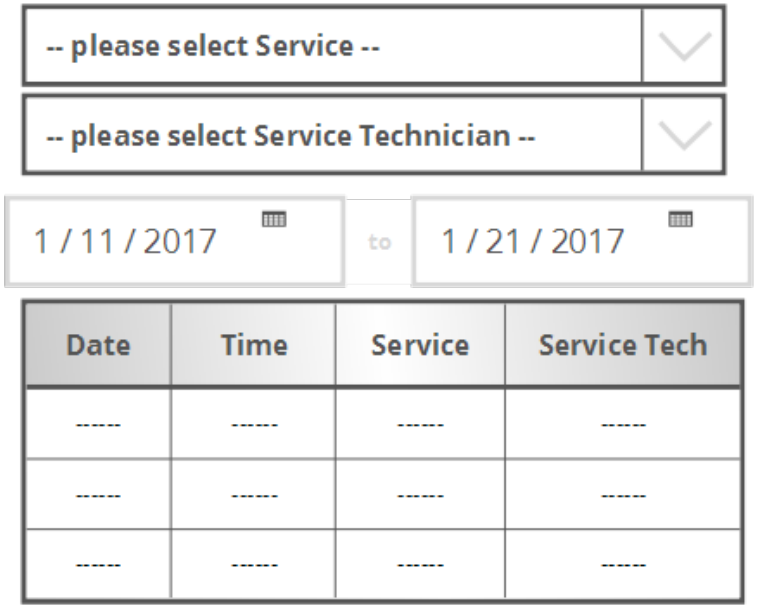
Name	Phone Number	Appt Date	Service
------	------	------	------
------	------	------	------
------	------	------	------

```
CREATE TABLE service_appointment_by_client_name (
    service_appointment_datetime timestamp,
    client_id uuid,
    client_name text,
    client_phone_number text,
    service_id uuid,
    service_name text,
    PRIMARY KEY (client_name, appointment_datetime, service_name)
) WITH CLUSTERING ORDER BY (appointment_datetime DESC, service_name ASC);
```

```
CREATE TABLE service_appointment_by_client_phone(
    service_appointment_datetime timestamp,
    client_id uuid,
    client_name text,
    client_phone text,
    service_id uuid,
    service_name text,
    PRIMARY KEY (client_phone, appointment_datetime, service_name)
) WITH CLUSTERING ORDER BY (appointment_datetime DESC, service_name ASC);
```

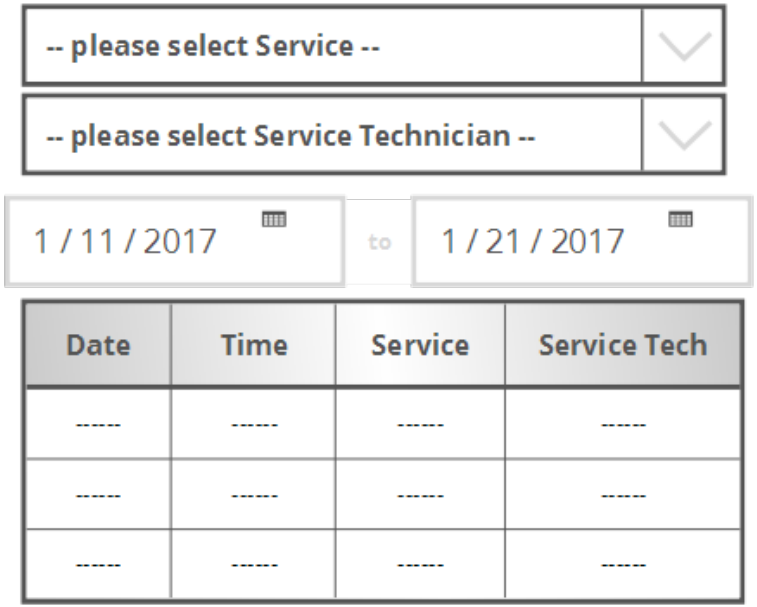
Physical Model

Get all available times to schedule appointment for specified service & service technician



Physical Model

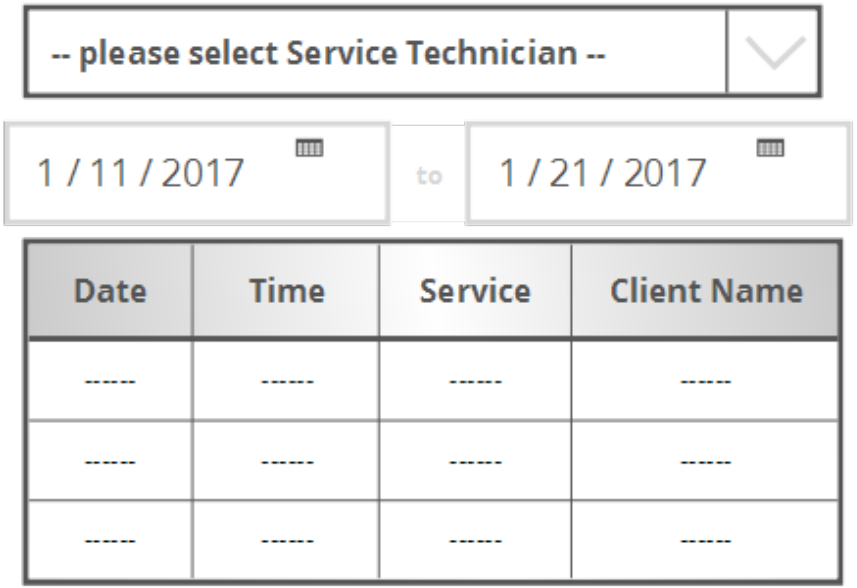
Get all available times to schedule appointment for specified service & service technician




```
CREATE TABLE available_appointment (
    date text,
    service_id uuid,
    service_name text,
    service_provider_employee_id uuid,
    service_provider_employee_name text,
    hour text,
    PRIMARY KEY (date, service_name, service_employee_name, hour)
);
```

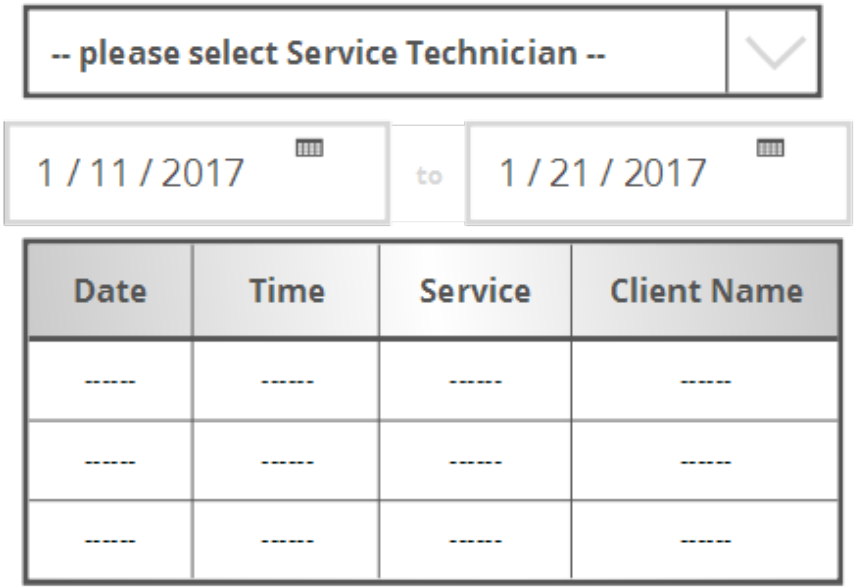
Physical Model

Get all scheduled appointments for specified service technician



Physical Model

Get all scheduled appointments for specified service technician




```
CREATE TABLE scheduled_appointment_by_date_service_employee_name (
    date text,
    service_provider_employee_id uuid,
    service_provider_employee_name text,
    service_id uuid,
    service_name text,
    time_start text,
    time_end text,
    client_id uuid,
    client_name text,
    PRIMARY KEY (date, service_employee_name, time_start)
);
```

Physical Model

End Product: A complete script to create your entire Data Model in Cassandra

```
CREATE TABLE client (
    client_id uuid PRIMARY KEY,
    gender text,
    name text,
    phone_number text
);
```

```
CREATE TABLE client_by_name (
    name text,
    client_id uuid,
    phone_number text,
    gender text,
    PRIMARY KEY (name, client_id)
) WITH CLUSTERING ORDER BY (client_id ASC);
```

```
CREATE TABLE client_by_phone_number (
    phone_number text,
    client_id uuid,
    name text,
    gender text,
    PRIMARY KEY (phone_number, client_id)
) WITH CLUSTERING ORDER BY (client_id ASC);
```

```
CREATE TABLE service_appointment (
    service_appointment_id uuid PRIMARY KEY,
    appointment_datetime timestamp,
    client_id uuid,
    service_id uuid,
    service_provider_employee_id uuid,
    service_provider_id uuid,
    service_stated_duration int
);
```

```
CREATE TABLE service_appointment_by_client_name (
    service_appointment_datetime timestamp,
    client_id uuid,
    client_name text,
    client_phone_number text,
    service_id uuid,
    service_name text,
    PRIMARY KEY (client_name, appointment_datetime, service_name)
) WITH CLUSTERING ORDER BY (appointment_datetime DESC, service_name ASC);
```

```
CREATE TABLE service_appointment_by_client_phone(
    service_appointment_datetime timestamp,
    client_id uuid,
    client_name text,
    client_phone text,
    service_id uuid,
    service_name text,
    PRIMARY KEY (client_phone, appointment_datetime, service_name)
) WITH CLUSTERING ORDER BY (appointment_datetime DESC, service_name ASC);
```

```
CREATE TABLE available_appointment (
    date text,
    service_id uuid,
    service_name text,
    service_provider_employee_id uuid,
    service_provider_employee_name text,
    hour text,
    PRIMARY KEY (date, service_name, service_employee_name, hour)
);
```

```
CREATE TABLE scheduled_appointment_by_date_service_employee_name (
    date text,
    service_provider_employee_id uuid,
    service_provider_employee_name text,
    service_id uuid,
    service_name text,
    time_start text,
    time_end text,
    client_id uuid,
    client_name text,
    PRIMARY KEY (date, service_employee_name, time_start)
);
```

Thank You!
Questions?

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