Design Email Campaign Schema

Design a system to be used by various companies to reach out to their connections through automated email campaigns.

System requirements:

1. Companies should be able to add/update connections.
2. Companies should be able to create email campaigns.
3. Each campaign can have multiple email templates to be delivered after a specified duration of time if the connection does not reply to the mail.
4. Companies should be able to stop the campaign for all or some of the connections.
5. Email templates should be reusable (i.e. same template can be a part of different campaigns).

Future Scope:

1. Group connections based on any criteria (Ex: Backend Profile, Frontend Profile, ICPC Qualifier).
2. Group campaigns and templates based on any criteria.

Email Campaign Schema

Main Tables:

1. **Companies**

   - Company_id (PK) - INT, AUTO_INCREMENT
   - Name - VARCHAR(255), NOT NULL
   - Email - VARCHAR(255), NOT NULL, UNIQUE

2. **Connections**

   - Connection_id (PK) - INT, AUTO_INCREMENT
   - Company_id (FK) - INT, NOT NULL
   - Name - VARCHAR(255), NOT NULL
   - Email - VARCHAR(255), NOT NULL, UNIQUE

3. **Email_Templates**

   - Template_id (PK) - INT, AUTO_INCREMENT
   - Template_name - VARCHAR(255), NOT NULL
   - Subject - VARCHAR(255), NOT NULL
   - Body - TEXT, NOT NULL

4. **Campaigns**

   - Campaign_id (PK) - INT, AUTO_INCREMENT
   - Campaign_name - VARCHAR(255), NOT NULL
   - Start_date - DATE, NOT NULL
   - End_date - DATE

Lookup Tables:

5. **Campaign_Templates**

   - Campaign_template_id (PK) - INT, AUTO_INCREMENT
   - Campaign_id (FK) - INT, NOT NULL
   - Template_id (FK) - INT, NOT NULL
   - Delivery_duration - INT, NOT NULL

6. **Campaign_Connections**

   - Campaign_connection_id (PK) - INT, AUTO_INCREMENT
   - Campaign_id (FK) - INT, NOT NULL
   - Connection_id (FK) - INT, NOT NULL
   - Status - ENUM('Active', 'Stopped', 'Completed'), NOT NULL

7. **Company_Campaigns**

   - Company_campaign_id (PK) - INT, AUTO_INCREMENT
   - Company_id (FK) - INT, NOT NULL
   - Campaign_id (FK) - INT, NOT NULL

Future Scope Tables:

8. **Groups**

   - Group_id (PK) - INT, AUTO_INCREMENT
   - Group_name - VARCHAR(255), NOT NULL, UNIQUE

9. **Connection_Groups**

   - Connection_group_id (PK) - INT, AUTO_INCREMENT
   - Connection_id (FK) - INT, NOT NULL
   - Group_id (FK) - INT, NOT NULL

10. **Campaign_Groups**

    - Campaign_group_id (PK) - INT, AUTO_INCREMENT
    - Campaign_id (FK) - INT, NOT NULL
    - Group_id (FK) - INT, NOT NULL

11. **Template_Groups**

    - Template_group_id (PK) - INT, AUTO_INCREMENT
    - Template_id (FK) - INT, NOT NULL
    - Group_id (FK) - INT, NOT NULL

Cardinality and Relationships:

1. **Companies to Connections: One-to-Many (1:m)**

    - Each company can have multiple connections.
    - **Managed By:** Connections table with Company_id FK

2. **Companies to Campaigns: Many-to-Many (m:m)**

    - Each company can create multiple campaigns
    - Each campaign can be associated with multiple companies.
    - **Managed By:** Company_Campaigns table.

3. **Campaigns to Email_Templates: Many-to-Many (m:m)**

    - Each campaign can use multiple email templates
    - Each email template can be used in multiple campaigns.
    - **Managed By:** Campaign_Templates table.

4. **Campaigns to Connections: Many-to-Many (m:m)**

    - Each campaign can target multiple connections
    - Each connection can be part of multiple campaigns.
    - **Managed By:** Campaign_Connections table.

5. **Connections to Groups: Many-to-Many (m:m)**

    - Each connection can belong to multiple groups
    - Each group can contain multiple connections.
    - **Managed By:** Connection_Groups table.

6. **Campaigns to Groups: Many-to-Many (m:m)**

    - Each campaign can belong to multiple groups
    - Each group can contain multiple campaigns.
    - **Managed By:** Campaign_Groups table.

7. **Templates to Groups: Many-to-Many (m:m)**

    - Each template can belong to multiple groups
    - Each group can contain multiple templates.
    - **Managed By:** Template_Groups table.

Primary Keys:

1. **Companies:** Company_id
2. **Connections:** Connection_id
3. **Email_Templates:** Template_id
4. **Campaigns:** Campaign_id
5. **Campaign_Templates:** Campaign_template_id
6. **Campaign_Connections:** Campaign_connection_id
7. **Company_Campaigns:** Company_campaign_id
8. **Groups:** Group_id
9. **Connection_Groups:** Connection_group_id
10. **Campaign_Groups:** Campaign_group_id
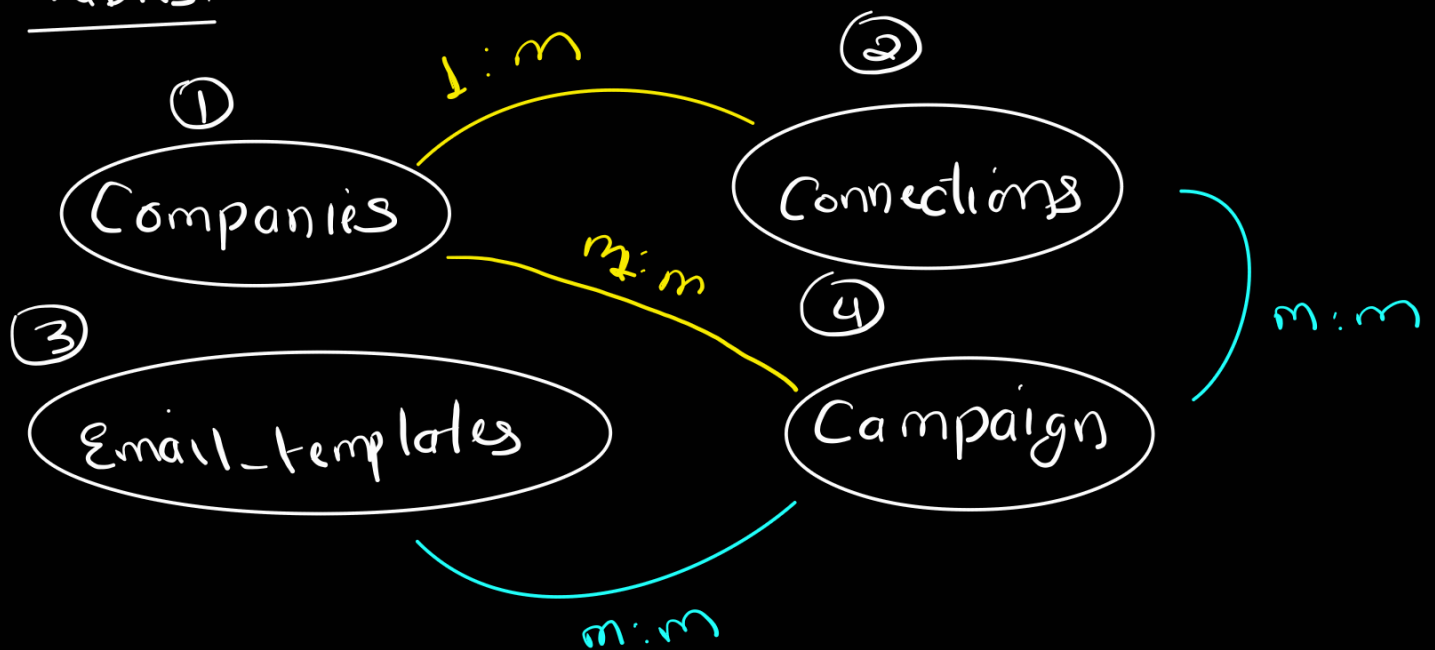11. **Template_Groups:** Template_group_id

Foreign Keys:

1. Company_id REFERENCES Companies(Company_id) ON DELETE CASCADE
2. Campaign_id REFERENCES Campaigns(Campaign_id) ON DELETE CASCADE
3. Template_id REFERENCES Email_Templates(Template_id) ON DELETE CASCADE
4. Campaign_id REFERENCES Campaigns(Campaign_id) ON DELETE CASCADE
5. Connection_id REFERENCES Connections(Connection_id) ON DELETE CASCADE
6. Company_id REFERENCES Companies(Company_id) ON DELETE CASCADE
7. Campaign_id REFERENCES Campaigns(Campaign_id) ON DELETE CASCADE
8. Connection_id REFERENCES Connections(Connection_id) ON DELETE CASCADE
9. Group_id REFERENCES Groups(Group_id) ON DELETE CASCADE
10. Campaign_id REFERENCES Campaigns(Campaign_id) ON DELETE CASCADE
11. Group_id REFERENCES Groups(Group_id) ON DELETE CASCADE
12. Template_id REFERENCES Email_Templates(Template_id) ON DELETE CASCADE
13. Group_id REFERENCES Groups(Group_id) ON DELETE CASCADE

Indexes:

1. **Companies** :-   Index on Email (UNIQUE)
2. **Connections** :-   Index on Email (UNIQUE) , on Company_id (FK)
3. **Email_Templates** :-   Index on Template_name
4. **Campaigns** :-   Index on Campaign_name
5. **Campaign_Templates** :-   Index on Campaign_id (FK) , on Template_id (FK)
6. **Campaign_Connections** :-   Index on Campaign_id (FK) , on Connection_id (FK)
7. **Company_Campaigns** :-   Index on Company_id (FK) , on Campaign_id (FK)
8. **Connection_Groups** :-   Index on Connection_id (FK) , on Group_id (FK)
9. **Campaign_Groups** :-   Index on Campaign_id (FK) , on Group_id (FK)
10. **Template_Groups** :-   Index on Template_id (FK) , on Group_id (FK)

Tables:-

① Companies ——1:m—— ② Connections

Companies ——m:m—— Campaign

④

③ Email_templates

Connections ——m:m—— Campaign

Email_templates ——m:m—— Campaign

⑤ campaign_templates

⑥ Campaign connections

⑦ Company_Campaign

Companies

Comp_id int	PK
Name Varchar	
Email varchar	

Connections

Conn_id int	PK
Comp_id int	FK
Name Varchar	
Email Varchar	

Campaign

Camp_id int	PK
Camp_name Varchar	
Start Date	
End Date	

Email_templates

Temp_id int	PK
Name Varchar	
Subject Varchar	
Body – Text	

Campaign_Template

Camp-temp_id	PK
camp_id	FK
Temp_id	FK
Duration int	

Camp_Connection

camp_cnn_id	PK
Camp_id	FK
conn_id	FK
Status ENUM [Active, STOPPED, Completed]	

Company_Camp

comp_Camp-id	PK
Comp_id	FK
Camp_id	FK

Future Scope Tables

connections

Campaign

Email_template

Groups

m:m
m:m
m:m
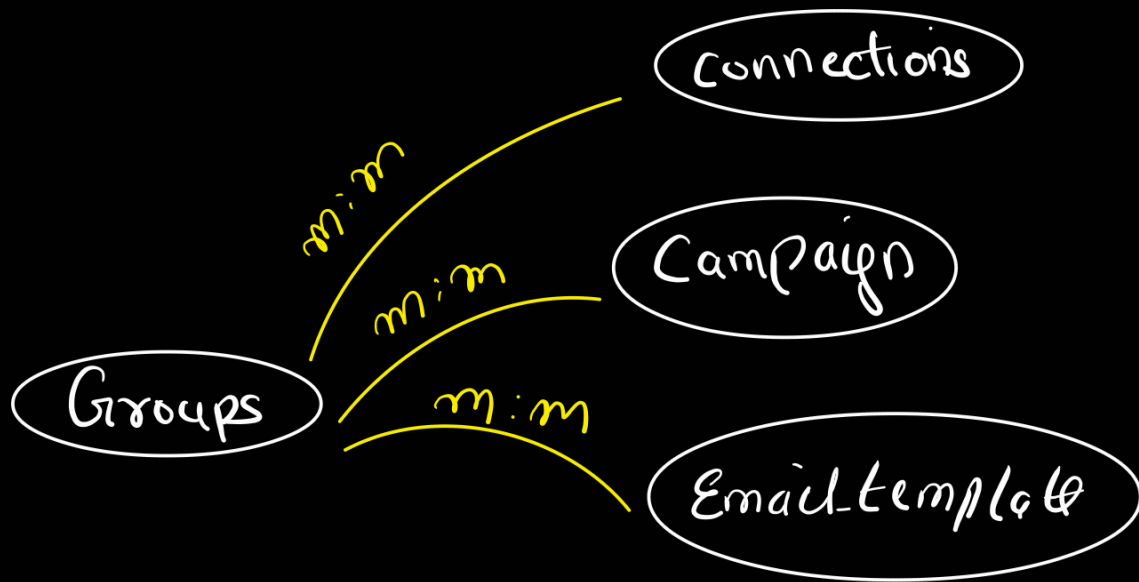
Connection_Groups   Conn_id , Group-id FK

Campaign_Groups   Camp_id, Group-id FK

Email_template_Groups   Temp_id, Group-id FK

Groups	
Group_id int	PK
Name Varchar	

Conn Groups	
Con-grp_id int	PK
Conn_id	FK
Group_id	FK

Camp_Groups	
Camp_grp_id int	PK
Camp_id	FK
Group-id	FK

Temp_Groups	
Temp-grp_id int	PK
Temp_id	FK
Group_id	FK