Database Systems

(331-32)

Netflix

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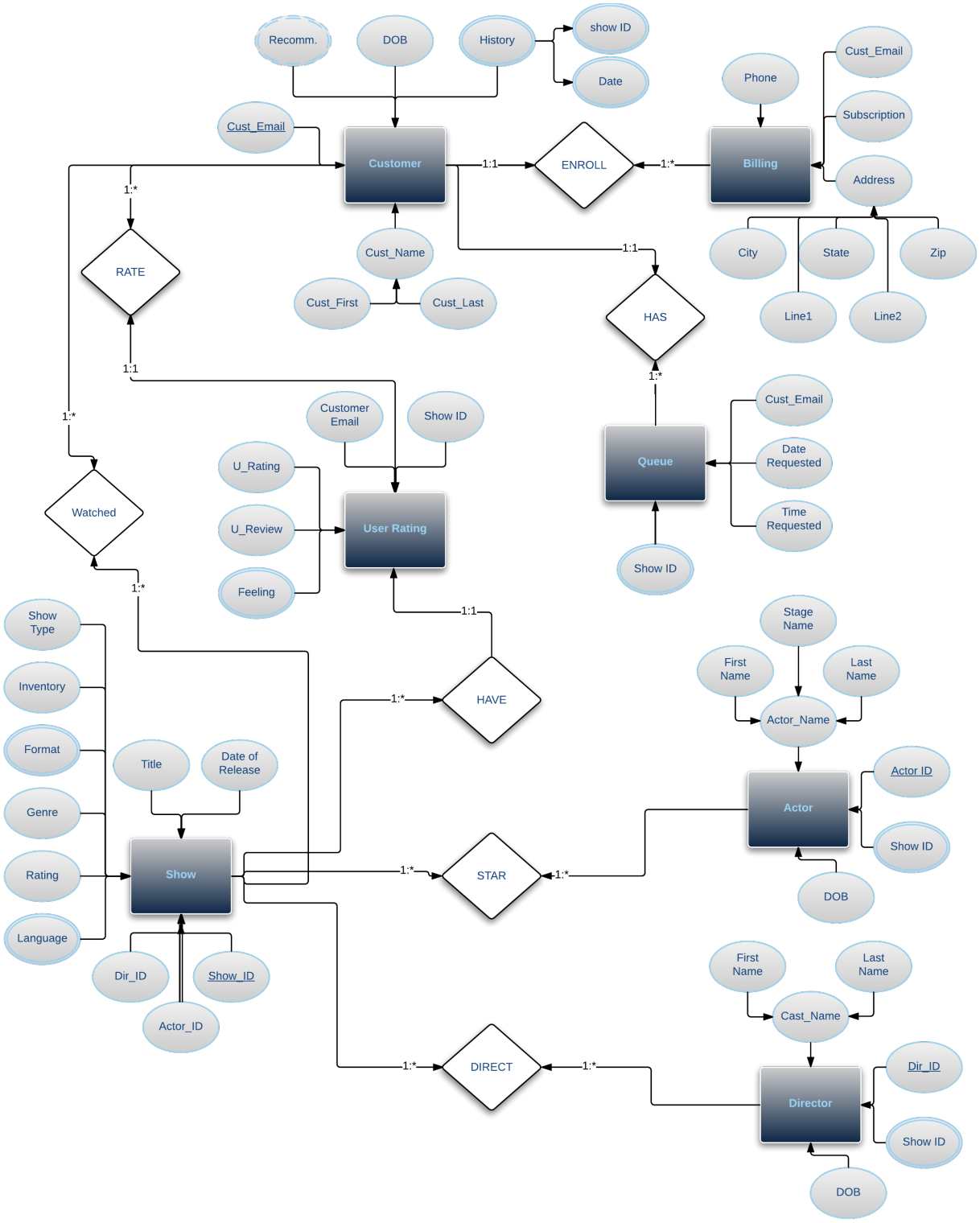
Netflix (Entity Relationship Diagram)



Conversion from ER Diagram to Relation

Show(sID, sType, Rating, Title, Release_Date, End_Date, Episodes, Seasons)

Genre(sID, Genre, Show_Type)

Language(sID, Genre, Show_Type)

Format(sID, Genre, Show_Type)

Feeling(sID, Genre, Show_Type)

Customer(cMail, cFirst, cLast, DOB, Age)

Billing(cMail, Subscription, Street1, Street2, City, State, Zip_Code, Phone)

Queue (qID, sID, cMail)

Shows_Watched (sID, cMail, Format, dBorrow, dReturn)

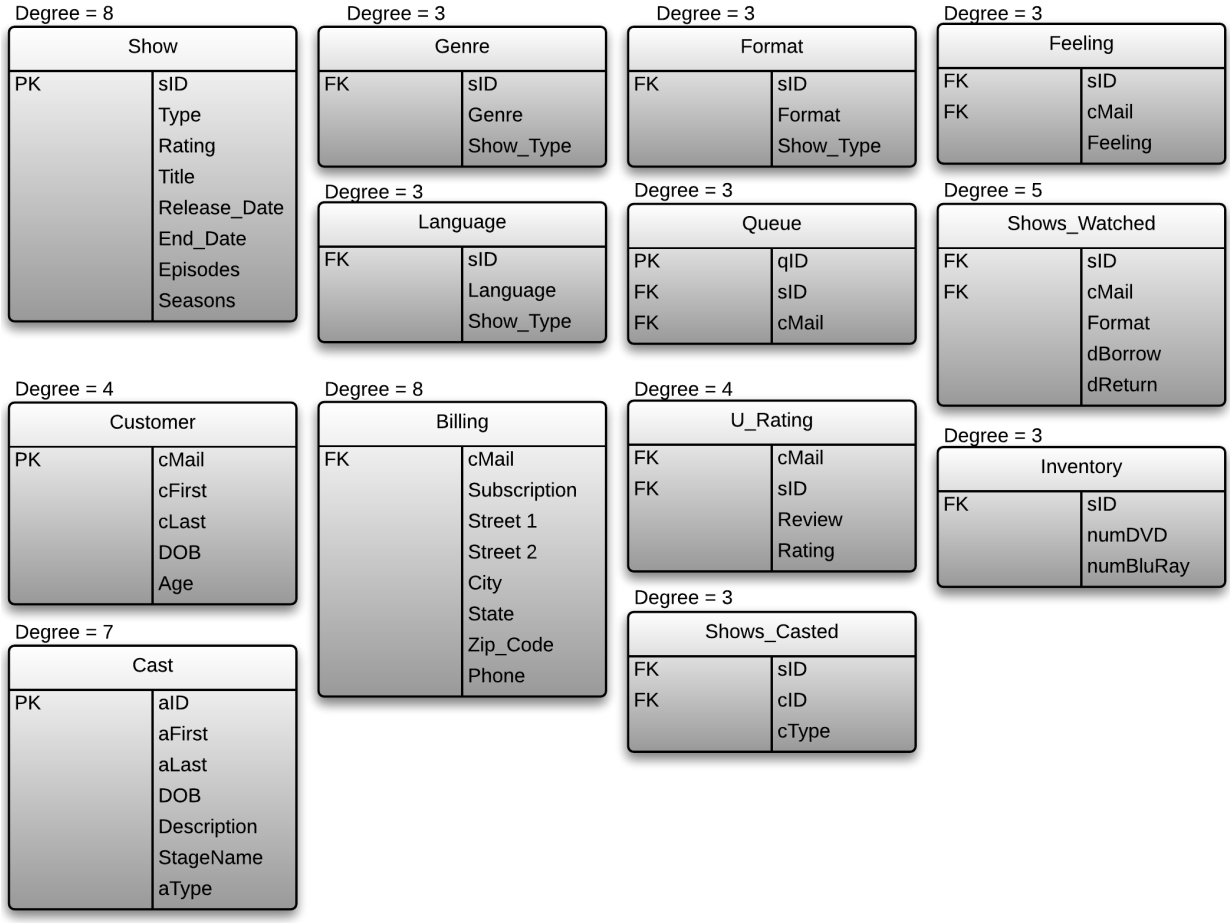
U_Rating (cMail, sID, Review, Rating)

Inventory (sID, numDVD, numBluRay)

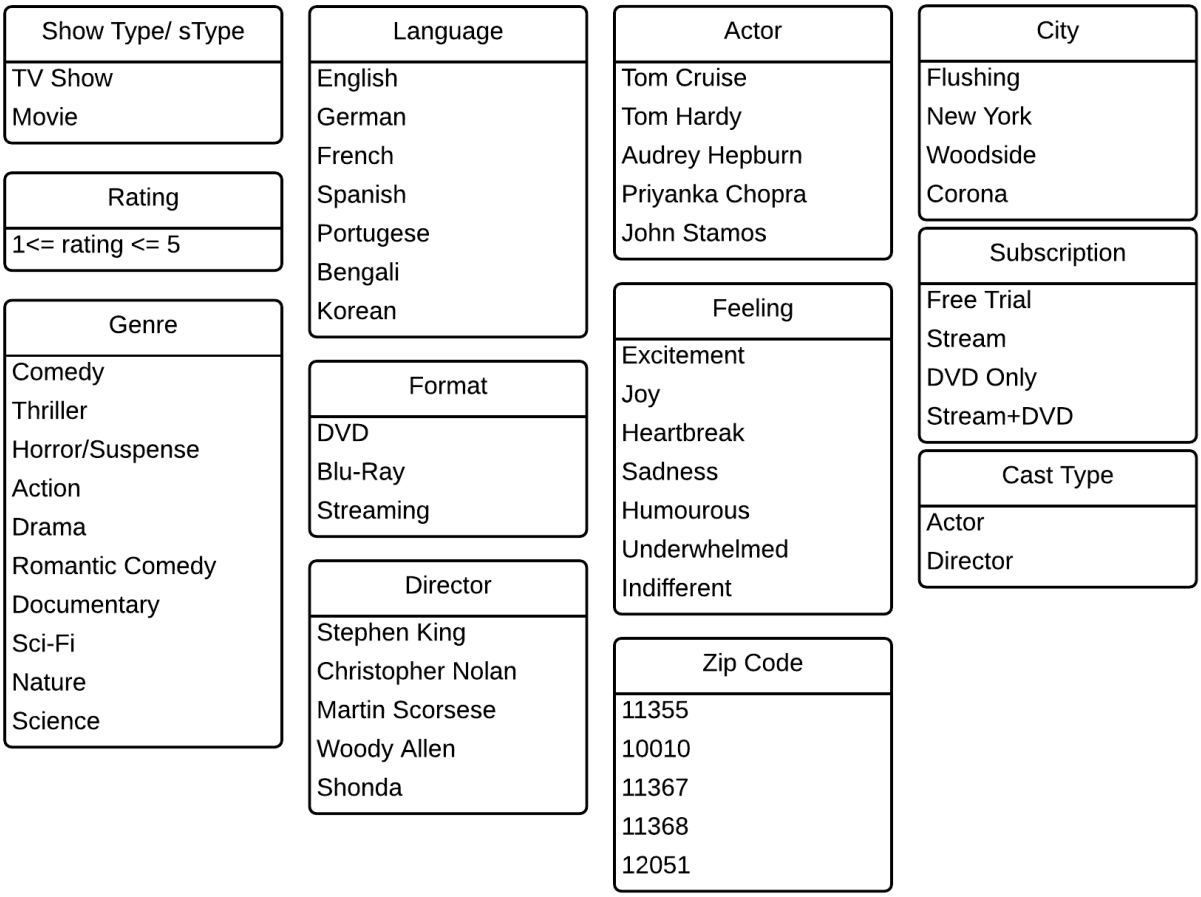
Cast (aID, aFirst, aLast, DOB, description, StageName, aType)

Shows_Casted(sID, cID, cType)

Relation Diagram



Domains


Show Type/ sType
TV Show
Movie
Rating
1<= rating <= 5
Genre
Comedy
Thriller
Horror/Suspense
Action
Drama
Romantic Comedy
Documentary
Sci-Fi
Nature
Science
Language
English
German
French
Spanish
Portugese
Bengali
Korean
Format
DVD
Blu-Ray
Streaming
Director
Stephen King
Christopher Nolan
Martin Scorsese
Woody Allen
Shonda
Actor
Tom Cruise
Tom Hardy
Audrey Hepburn
Priyanka Chopra
John Stamos
Feeling
Excitement
Joy
Heartbreak
Sadness
Humourous
Underwhelmed
Indifferent
Zip Code
11355
10010
11367
11368
12051
City
Flushing
New York
Woodside
Corona
Subscription
Free Trial
Stream
DVD Only
Stream+DVD
Cast Type
Actor
Director

Sample Tuples

Show

sID	sType	Title	Release_Date	End_Date	Episodes	Seasons	Rating
0101	Movie	Mission: Impossible	01/11/14	----------	----------	---------	3.9
0102	Show	How I Met Your Mother	05/03/06	05/03/15	230	8	3.5

Genre

sID	Genre	Show_Type
0101	Action	Movie
0101	Comedy	Movie

Language

sID	Language	Show_Type
0101	English	Movie
0102	English	TV Show

Format

sID	Format	Show_Type
0102	DVD	TV Show
0102	Blu-Ray	TV Show

Feeling

sID	Feeling	Show_Type
0101	Exciting	Movie
0101	Adventurous	Movie

Customer

cMail	cFirst	cLast	DOB	Age
MGraham@gmail.com	Martha	Graham	02/03/72	44
JonSmith@yahoo.com	Jon	Smith	01/01/81	35

Billing

cMail	Credit_No	Street 1	Street 2	City	State	Zip_Code	Phone
MGraham@gmail.com	222-222-222	1414 Main St	Apt 7G	Flushing	NY	11355	9172155555
JonSmith@yahoo.com	222-333-3333	1314 Main St		Flushing	NY	11355	718888888

Queue

qID	sID	cMail
1	0101	mgraham@gmail.com
2	0101	johnsmith@yahoo.com

Shows_Watched

sID	cMail	Format	dBorrow	dReturn
0101	mgraham@gmail.com	Streaming	01/01/16	--------
0102	mgraham@gmail.com	DVD	01/01/16	01/03/16

U_Rating

cMail	sID	Review	Rating
mgraham@gmail.com	0101	“Great!”	4.5
mgraham@gmail.com	0102	“Boring”	2.3

Inventory

sID	numDVD	numBluRay
0101	300	240
0102	222	123

Cast

aID	aFirst	aLast	DOB	Description	StageName	aType
1123	Amy	Schumer	01/01/89	“I want to make people laugh”	Amy Schumer	Director
1124	Tom	Cruise	0101/79	“Love is a drug”	Tom Cruise	Acot

Shows_Casted

sID	cID	cType
1123	0102	TV Show
1124	0101	Movie

Query

1. **Identify all "Comedy" TV Shows in "Streaming" with "Tom Cruise" or "Tom Hardy". Display the show name, rating and feeling.**

ComGen←$\delta_{Show.sID = Genre.sID \wedge Show.type="TV Show" \wedge Genre.genre="Comedy"}$ **(**Show X Genre**)**

ComGen2 ← $\pi_{sID, title, rating}$ **(**ComGen**)**

ComShow←$\delta_{Cast.sID = ComGen2.sID \wedge Cast.aType="Actor" \wedge Cast.aFirst = "Tom" \wedge (Cast.aLast = "Hardy" \vee Cast.aLast = "Cruise")}$
(ComGen2 X Cast**)**

StreamSh ← $\delta_{Format.sID = ComShow.sID \wedge Format.format = "Streaming"}$**(**ComShow X Format**)**

StreamSh2 ← $\pi_{sID, title, Rating}$ **(**StreamSh**)**

FeelingSh ← $\delta_{StreamSh2.sID = Feeling.sID}$ **(**StreamSh2 X Feeling**)**

Result ← $_{Title, Rating}\boldsymbol{F}_{sum(feeling)}$**(**FeelingSH**)**

2. **placement in the queue, the show name and the average user rating.**

CustQ←$\delta_{Customer.cMail = Queue.cMail \wedge Customer.cFirst = "Martha" \wedge Customer.\ cLast = "Graham"}$ **(**Customer X Queue**)**

ShowQR←$\delta_{CustQ.\ sID = U\_Rating.sID}$ (CustQ X U_Rating)

AvgRate ← $_{sID}\boldsymbol{F}_{AVG\ (Ratings)}$*(ShowQR)*

AvgRateQ←$\delta_{AvgRate.sID = Show.sID}$ (AvgRate X Show)

Result← $\pi_{qID, title, avg\_rating}$ (AvgRateQ)

Result *(Relation)*

3. **Identify all "DVD" shows borrowed by "Edward Burton" in the last "2" years. Display the show name, borrow date and return date.**

CustSho←$\delta_{Customer.cFirst = "Edward" \wedge Customer.cLast = "Burton" \wedge Customer.cMail = Shows\_Watched.cMail \wedge Shows\_Watched.dBorrow > 01/01/14}$ (Customer X Shows_Watched)

CustShoTitle←$\delta_{CustShow.sID = Show.sID}$ (CustSho X Show)

Result← $\pi_{title, dBorrow, dReturn}$ (CustShoTitle)

4. **Identify highly rated "Horror" shows. Display the show name and average user rating.**

ShoGen←$\delta_{Show.sID = Genre.sID \wedge Genre.Genre = "Horror"}$ (Show X Genre)

ShoGen2← $\pi_{sID, title, genre}$ (ShowGen)

ShoGenRate←$\delta_{ShowGen2.sId = U\_Rating.sID}$ (ShoGen2 X U_Rating)

AvgRate ← $_{sID, title}\boldsymbol{F}_{AVG\ (Ratings)}$*(ShowGenRate2)*

Result← $\pi_{title, avg\_ratings}$ (AvgRate)

5. **Identify the number of DVD's borrowed by genre. Display two columns: genre and number of rentals. Display one row for each genre.**

GenNum←$\delta_{Shows\_Watched.sID = Genre.sId \wedge (Shows\_Watched.format = "DVD" \vee Shows\_Watched.format "Blu-Ray")}$ (Shows_Watched X Genre)

Result← **P** $_{result}$(Genre, Number of Rentals) $_{Genre}\boldsymbol{F}_{count\ (dBorrow)}$ *(GenNum)*

6. **Identify popular shows borrowed or streamed near "Flushing" in the last "6 Months". Display the show name and number of times borrowed or streamed. Display one row for each show name.**

CustShow←$\delta_{Shows\_Watched.cMail = Billing.cMail \wedge Billing.city = "Flushing" \wedge Shows\_Watched.dBorrowed >= 09/09/15}$ (Shows_Watched X Billing)

PopShow←$\delta_{CustShow.sID = U\_Rating.sID}$ (CustShow X U_Rating)

PopShow2← $\pi_{sID, dBorrowed, format, cMail, city, u\_rating.rating}$ (PopShow)

PopShow3 ← $\delta_{Show.sID = PopSho2.sID}$ (PopShow2 X Show)

ResPopShow← $\pi_{sID, cMail, title, dBorrowed, format, city, u\_rating.rating,}$ (PopShow3)

Res← **P** $_{res}$(SID, Show_Title, Times_Watched, Rating) $_{sID, title}$ ***F*** $_{count (Format), sum(rating)}$ *(ResPopShow)*

Res1←$\delta_{Rating=>4}$ (CustShow X U_Rating)

Result← $\pi_{Show\_Title, Times\_Watched}$ (Res1)

7. **Identify the number of shows by cast. Display two columns: cast name and number of shows they appear. Display one row for each cast name.**

ShowCast←$\delta_{Cast.cID = Shows\_Casted.cID \wedge Cast.cType = "Actor"}$ (Cast X Shows_Casted)

Result← **P** $_{result}$(Name, Number of Shows) $_{Cast.stagename}$ ***F*** $_{count (sID)}$ (ShowCast)

8. **Identify shows not streamed or borrowed in the last year. Display two columns: show name and average user rating.**

Activity ← $\delta_{dBorrowed >=2015 \wedge dBorrowed <=2016}$ (Shows_Watched)

NoAct← π_{sID} (Shows) - π_{sID} (Activity)

Activity ← $\delta_{NoAct.sID= Show.sID}$ (Shows X NoAct)

Activity2← $\pi_{sID, title}$ (Activity)

ShowAvg ← $\delta_{NoAct.sID= Show.sID}$ (Shows X U_Rating)

Result← **P** $_{result}$(ID, Name, Avg_Rating) $_{sID,title}$ ***F*** $_{avg (rating)}$ (ShowAvg)

9. **Identify customers with no activity in the last "3 years" (customers who have not borrowed a DVD or streamed a show). Display two columns: customer name and email address.**

Activity ← $\delta_{Shows\_Watched.cMail=Customer.cMail \wedge dBorrowed >=2013 \wedge dBorrowed <=2016}$ (Shows_Watched x Customer)

NoAct← $\pi_{cMail, cFirst, cLast}$ (Shows) - $\pi_{cMail, cFirst, cLast}$ (Activity)

Result← **P** $_{result}$(Name, Email) $_{cFirst, cMail}$ (NoAct)

10. Identify shows without user ratings. Display two columns: show name, release date and cast.

Activity ← $\delta_{rating>=1}$ (U_Rating)

NoAct← π_{sID} (Shows) - π_{sID} (Activity)

NoRatings ← $\delta_{NoAct.sID= Shows.sID}$ (Shows X NoAct)

NoRateCast ← $\delta_{NoRatings.sID= Shows\_Casted.sID}$ (NoRatings X Shows_Casted)

Casting← $\pi_{sID, aID, title, release\_date}$ (NoRateCast)

CastName ← $\delta_{Casting.aID = Cast.aID}$ (Casting X Cast)

Res1← $\pi_{title,release\_date\ ,\ cast.stagename}$ (CastName)