- Records(tradeID, year, term, unit, purpose, source, origin, import\_claimed\_quantity, export\_claimed\_quantity ) 注意这里删去了creature\_ID, country

BCNF

- Creature (creature\_ID, isAnimal, year, appendix, taxon, class, order, family, genus, name, habitat)

BCNF

- Creature\_habitat(creature\_ID, habitat) （因为habitat可能有多个所以单独设置一个表）

BCNF

Habitat会记到何种程度，如果是国家的话，是不是可以改成和country的relation

若不为国家，单独列一个表，这个表在整个ER中是不存在任何relationship的，此时要不要考虑将habitat列一个表，然后创建habitat和creature的relationship的relationship？

- Country(country\_name, ISO, Region, Party\_state, Convention\_type, join\_date, UN\_scale, CITES\_scale, contribution, isMember)

BCNF

- Institutions(IID, address, Certificate, validation\_date) 应该删去country用relationship表示

BCNF

- Staff (Staff\_ID, age, gender, committee, position, salary) nationality和committee用关系表示

BCNF

- 新创建了Committee (id, name)这个表，用于后续staff\_committee的relation

- Fund (fund\_ID, Party, CITES\_adjusted\_scale, latest\_triennium\_contribution, annual\_avg\_contribution, paid\_state) party删去，改成关系

BCNF

Conference (conference\_id, name, day, month, year, location)

如果假设day, month, year可以推出其他:

Sql中day month year一起构成一个数据类型date

CITES\_application(ApplicationID, importCountry, exportCountry, re-export country, import\_institution,importPermitID , export\_institution, exportPermitID, creature\_ID, department, status, import\_claimed\_quantity, export\_claimed\_quantity) 和country, institution, creature, department, permit之间改成relation

可以直接删去importer name

即：applicationID, creature\_ID (BCF)

ApplicationID, importCountry, exportCountry, import\_insti, export\_insti (BCNF)

ApplicationID, department (BCNF)

ApplicationID, importPermitID, exportPermitID

拆分之后还有：applicationID and status

Permission(permitID, importer\_name, institution, type)

This one is redundant with the relation above

Permission 指的是所有机构已经颁发的permission汇总还是CITES对于application通过后的汇总？

Relationship

* between Records and Country (for illegal trades) [many to one]

- import(recordID, country) BCNF

- export(recordID, country) BCNF

~~reexport(record, country)~~

~~recordedAt(record,country)~~

* between staff and Country [m 2 1]

- staff\_country(staff\_ID, nationality) BCFN

忽略多国籍的情况

... and record [m2m]

- responsible\_for(recordID, staffID) BCNF

* between Funds and Country [one to one]

- sponsor (fundID, country) BCNF

between Conference and Country [m2m]

- participate (conference\_id, country) BCNF

- held (conference\_id, country) (表示举办地点，many-to-one)

* Record:

staff(record, staff\_id) : 负责record的人 (many to one) BCNF

- import(recordID, country) (many to one) BCNF

- export(recordID, country) (many to one) BCNF

- reexport(recordID, country) (many to one) BCNF

* Creature:

- record\_creature (recordID, creature) (one creature to many records) BCNF

- originated(creature, country) (many to many) BCNF

- applied\_creature(applicationID, creatureID) (many to many) BCNF

- last\_update(creatureID, conferenceID) (many 2 one) BCNF

* Country

- country\_institution (country, institution) (one 2 many) BCNF

- nationality\_staff(country, staffID) (one to many) BCNF

- sponsor(fund\_ID, country\_name) (many to one) BCNF

* Application

- app\_permi (applicationID, permissionID) (one to one)

Because we do not necessarily have the permission, so the permissionID can not act as the primary key. Thus, only applicationID is the PK. How to show on the ER?

如果是permission指的是由进出口机构颁发的记录的话，那么不会是null? Application和permission之间的对应关系就变成了每个application必然包含permission？

- app\_institution(appID, IID) (many to one) BCNF

~~app\_staff(appID, staffID) (many to one) Should be many-to-many?~~

* Staff:

- staff\_committee(staffID, committee\_type) (many to one) BCNF

- managedBy(staffID, staffID) (many to one) BCNF

- attendedConference(confID, staffID) (many to many) BCNF

Generalization

Query 的内容：

Records and country

1. 找出一个国家的所有records 按照各项attributes排序
2. (按照attributes) 对国家排序(rollup)
3. 平均一次走私的物品数量（average）

Staff and country

1. 找出一个国家的工作人员
2. 职员国籍排序
3. 找出工作地点和负责地点（负责人地点）相同的职员

Funds and country:

1. 那个国家捐的钱多
2. 根据国家查找今年的funds和总sum (得出欠多少钱)

Conference:

1. 按照会议找到举办国 / 参与国
2. 按动物找到last update
3. 找到与会议举办国相同的工作人员

Record and staff:

找到staff负责的所有records

找到records由谁负责

Creature:

按照各项attributes对所有保护动物排序

按照动物origin的数量对国家排序

哪个动物被apply的次数最多 （平均apply次数）

Country institution:

列出所有一个国家内的institution

每个国家institution的进口/出口尺度：哪个机构最容易批准申请

为了用Moving average: 以3年作为跨度，得moving average of the preceding 3 years （作用： 分析动物贸易数量的趋势）