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**Distributed Database Systems**

Problem: *Manage people and their licenses.*

- Create database SG, HN, CA with some contraints such as primary key, foreign key and insert somes rows for testing (Example: 03 rows for each table).

- Create user admin at each server (SG, HN, CA)

***Tables:***

// SG (computer 1), HN (computer 2)

create table Person(

personID int primary key,

name varchar(10),

DoB Date,

birthPlace int,

currentPlace int

);

create table Location(

locationID int primary key,

city varchar(20) ,

district varchar(20)

);

alter table Person add constraint fk\_location\_person foreign key (birthPlace) references location (locationID);

// CA (computer 3)

create table Person(

personID int primary key,

fine int

);

create table DriverLicense(

driverID int primary key,

personID int,

givenDate Date,

licenseType varchar(3),

expiredDate Date

);

***Trigger:***

***At SG:***

CREATE TRIGGER checkLocation

ON dbo.Person

for INSERT

AS

begin

DECLARE @currentPlace int, @dem int

SELECT @currentPlace = currentPlace FROM inserted

SELECT @dem = COUNT(locationID) FROM [LINKED\_SG].[SG].[dbo].[Location] WHERE locationID = @currentPlace;

if @dem = 0

begin

SELECT @dem = COUNT(locationID) FROM Location WHERE locationID = @currentPlace;

if @dem = 0

print 'Invalid location! Cannot insert person!'

rollback tran

end

end

CREATE TRIGGER checkUser

ON dbo.Person

for INSERT

AS

begin

DECLARE @dem int, @personID int

select @personID = personID from inserted

SELECT @dem = COUNT(personID) FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

if @dem != 0

begin

print 'PersonID already existed! Please choose another ID'

rollback tran

end

end

***At HN:***

CREATE TRIGGER checkUser

ON dbo.Person

for INSERT

AS

begin

DECLARE @dem int, @personID int

select @personID = personID from inserted

SELECT @dem = COUNT(personID) FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

if @dem != 0

begin

print 'PersonID already existed! Please choose another ID'

rollback tran

end

else

end

***At CA:***

CREATE TRIGGER checkUser

ON dbo.Person

for INSERT

AS

begin

DECLARE @dem int, @personID int

SELECT @personID = personID FROM inserted;

SELECT @dem = COUNT(personID) FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

if @dem = 0

begin

SELECT @dem = COUNT(personID) FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

if @dem = 0

begin

print 'Cannot find this person ID'

rollback tran

end

end

end

***Stored procedures:***

***At SG:***

***Note:***

***+ LINKED\_SG: Linked server: link to the database of computer 1***

***+ LINKED\_HN: Linked server: link to the database of computer 2***

***+ LINKED\_CA: Linked server: link to the database of computer 3***

1. ***Procedure: AddPerson***

CREATE PROCEDURE AddPerson @personID int, @name varchar(10), @DoB Date, @birthPlace int, @currentPlace int

AS

BEGIN

IF @birthPlace < 2000

begin

INSERT INTO Person values(@personID, @name, @DoB, @birthPlace, @currentPlace);

INSERT INTO [LINKED\_CA].[CA].[dbo].[Person] values(@personID, 0);

end

ELSE

begin

IF @birthPlace < 3000

INSERT INTO [LINKED\_HN].[HN].[dbo].[Person] values(@personID, @name, @DoB, @birthPlace, @currentPlace);

INSERT INTO [LINKED\_CA].[CA].[dbo].[Person] values(@personID, 0);

end

END;

1. ***Procedure: ViewPerson***

CREATE PROCEDURE ViewPerson @personID int

AS

BEGIN

DECLARE @dem int, @name varchar(10), @DoB Date

SELECT @dem = COUNT(personID) FROM Person WHERE personID = @personID;

if @dem > 0

begin

SELECT @personID = personID, @name = name, @DoB = DoB FROM Person WHERE personID = @personID;

print 'ID: ' + CAST(@personID as varchar)

print 'Name: ' + CAST(@name as varchar)

print 'Birthday: ' + CAST(@DoB as varchar)

print 'Person was born in Sai Gon.'

end

ELSE

begin

SELECT @dem = COUNT(personID) FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

SELECT @personID = personID, @name = name, @DoB = DoB FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

print 'ID: ' + CAST(@personID as varchar)

print 'Name: ' + @name

print 'Birthday: ' + CAST(@DoB as varchar)

print 'Person was born in Ha Noi.'

end

else

begin

print 'This PersonID does not exist!'

end

end

END;

1. ***Procedure: DeletePerson***

CREATE PROCEDURE DeletePerson @personID int

AS

BEGIN

DECLARE @dem int

SELECT @dem = COUNT(personID) FROM Person WHERE personID = @personID;

if @dem > 0

begin

DELETE FROM Person WHERE personID = @personID;

print 'Person is deleted.'

end

else

begin

SELECT @dem = COUNT(personID) FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

DELETE FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

print 'Person is deleted.'

end

else

print 'Person does not exist!'

end

END;

1. ***Procedure: AddLocation***

CREATE PROCEDURE AddLocation @locationID int, @city varchar(20), @district varchar(20)

AS

BEGIN

IF @locationID < 2000 and @city = 'Sai Gon'

INSERT INTO Location values(@locationID, @city, @district);

ELSE

begin

IF @locationID < 3000 and @city = 'Ha Noi'

INSERT INTO [LINKED\_HN].[HN].[dbo].[Location] values(@locationID, @city, @district);

--INSERT INTO [LINKED\_CS].[CS].[dbo].[Person] values(@personID, @name, @DoB, @birthPlace, @currentPlace);

end

END;

1. ***Procedure: ViewLocation***

CREATE PROCEDURE ViewLocation @locationID int

AS

BEGIN

declare @dem int, @city varchar(20), @district varchar(20)

SELECT @dem = count(locationID) from [LINKED\_HN].[HN].[dbo].[Location] where locationID = @locationID;

if @dem > 0

begin

SELECT @city = city, @district = district from [LINKED\_HN].[HN].[dbo].[Location] where locationID = @locationID;

print 'City: ' + @city + '. District: ' + @district

end

else

begin

SELECT @dem = count(locationID) from Location where locationID = @locationID;

if @dem > 0

begin

SELECT @city = city, @district = district from Location where locationID = @locationID;

print 'City: ' + @city + '. District: ' + @district

end

else

print 'Cannot find the city'

end

END;

1. ***Procedure: AddLicense***

CREATE PROCEDURE AddLicense @driverID int, @personID int, @givenDate Date, @expiredDate Date, @licenseType varchar(3)

AS

BEGIN

DECLARE @dem int

SELECT @dem = count(driverID) FROM [LINKED\_CA].[CA].[dbo].[DriverLicense] WHERE personID = @personID AND licenseType = @licenseType;

if @dem < 1

begin

INSERT INTO [LINKED\_CA].[CA].[dbo].[DriverLicense](driverID, personID, givenDate, licenseType, expiredDate) values (@driverID, @personID, @givenDate, @licenseType, @expiredDate);

end

else

print 'This person already have this license!'

END;

1. ***Procedure: AddFine***

CREATE PROCEDURE AddFine @personID int

AS

BEGIN

DECLARE @dem int, @fine int

SELECT @dem = count(personID) FROM [LINKED\_CA].[CA].[dbo].[Person] WHERE personID = @personID;

if @dem < 1

print 'Cannot find this person!'

else

SELECT @fine = fine FROM [LINKED\_CA].[CA].[dbo].[Person] WHERE personID = @personID;

UPDATE [LINKED\_CA].[CA].[dbo].[Person] SET fine = @fine + 1 WHERE personID = @personID;

END

1. ***Procedure: showAll***

CREATE PROCEDURE showAll

AS

BEGIN

select P1.personID, P1.name, P1.DoB, P1.birthPlace, P1.currentPlace, P2.fine from Person as P1, [LINKED\_CA].[CA].[dbo].[Person] as P2 WHERE P1.personID = P2.personID

union all

select P1.personID, P1.name, P1.DoB, P1.birthPlace, P1.currentPlace, P2.fine from [LINKED\_HN].[HN].[dbo].[Person] as P1, [LINKED\_CA].[CA].[dbo].[Person] as P2 WHERE P1.personID = P2.personID

END

***At HN***

1. ***Procedure: AddPerson***

CREATE PROCEDURE AddPerson @personID int, @name varchar(10), @DoB datetime, @birthPlace int, @currentPlace int

AS

BEGIN

IF @birthPlace < 2000

begin

INSERT INTO [LINKED\_SG].[SG].[dbo].[Person] values(@personID, @name, @DoB, @birthPlace, @currentPlace);

INSERT INTO [LINKED\_CA].[CA].[dbo].[Person] values(@personID, 0);

end

ELSE

begin

IF @birthPlace < 3000

INSERT INTO Person values(@personID, @name, @DoB, @birthPlace, @currentPlace);

INSERT INTO [LINKED\_CA].[CA].[dbo].[Person] values(@personID, 0);

end

END;

1. ***Procedure: ViewPerson***

CREATE PROCEDURE ViewPerson @personID int

AS

BEGIN

DECLARE @dem int, @name varchar(10), @DoB datetime

SELECT @dem = COUNT(personID) FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

SELECT @personID = personID, @name = name, @DoB = DoB FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

print 'ID: ' + CAST(@personID as varchar)

print 'Name: ' + CAST(@name as varchar)

print 'Birthday: ' + CAST(@DoB as varchar)

print 'Person was born in Sai Gon.'

end

ELSE

begin

SELECT @dem = COUNT(personID) FROM Person WHERE personID = @personID;

if @dem > 0

begin

SELECT @personID = personID, @name = name, @DoB = DoB FROM Person WHERE personID = @personID;

print 'ID: ' + CAST(@personID as varchar)

print 'Name: ' + @name

print 'Birthday: ' + CAST(@DoB as varchar)

print 'Person was born in Ha Noi.'

end

else

begin

print 'This PersonID does not exist!'

end

end

END;

1. ***Procedure: DeletePerson***

CREATE PROCEDURE DeletePerson @personID int

AS

BEGIN

DECLARE @dem int

SELECT @dem = COUNT(personID) FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

DELETE FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

print 'Person is deleted.'

end

else

begin

SELECT @dem = COUNT(personID) FROM Person WHERE personID = @personID;

if @dem > 0

begin

DELETE FROM Person WHERE personID = @personID;

print 'Person is deleted.'

end

else

print 'Person does not exist!'

end

END;

1. ***Procedure: AddLocation***

CREATE PROCEDURE AddLocation @locationID int, @city varchar(20), @district varchar(20)

AS

BEGIN

IF @locationID < 2000 and @city = 'Sai Gon'

INSERT INTO [LINKED\_SG].[SG].[dbo].[Location] values(@locationID, @city, @district);

ELSE

begin

IF @locationID < 3000 and @city = 'Ha Noi'

INSERT INTO Location values(@locationID, @city, @district);

end

END;

1. ***Procedure:*** ***ViewLocation***

CREATE PROCEDURE ViewLocation @locationID int

AS

BEGIN

declare @dem int, @city varchar(20), @district varchar(20)

SELECT @dem = count(locationID) from location where locationID = @locationID;

if @dem > 0

begin

SELECT @city = city, @district = district from Location where locationID = @locationID;

print 'City: ' + @city + '. District: ' + @district

end

else

begin

SELECT @dem = count(locationID) from [LINKED\_SG].[SG].[dbo].[Location] where locationID = @locationID;

if @dem > 0

begin

SELECT @city = city, @district = district from [LINKED\_SG].[SG].[dbo].[Location] where locationID = @locationID;

print 'City: ' + @city + '. District: ' + @district

end

else

print 'Cannot find the city'

end

END;

1. ***Procedure: AddLicense***

CREATE PROCEDURE AddLicense @driverID int, @personID int, @givenDate datetime, @expiredDate datetime, @licenseType varchar(3)

AS

BEGIN

DECLARE @dem int

SELECT @dem = count(driverID) FROM [LINKED\_CA].[CA].[dbo].[DriverLicense] WHERE personID = @personID AND licenseType = @licenseType;

if @dem < 1

begin

INSERT INTO [LINKED\_CA].[CA].[dbo].[DriverLicense](driverID, personID, givenDate, licenseType, expiredDate) values (@driverID, @personID, @givenDate, @licenseType, @expiredDate);

end

else

print 'This person already have this license!'

END;

1. ***Procedure: UpdateExpiredDate***

CREATE PROCEDURE UpdateExpiredDate @driverID int, @newDate datetime

AS

BEGIN

DECLARE @dem int

SELECT @dem = count(driverID) FROM [LINKED\_CA].[CA].[dbo].[DriverLicense] WHERE driverID = @driverID;

if @dem < 1

print 'This license does not exist'

else

UPDATE [LINKED\_CA].[CA].[dbo].[DriverLicense] SET expiredDate = @newDate WHERE driverID = @driverID;

END

1. ***Procedure: AddFine***

CREATE PROCEDURE AddFine @personID int

AS

BEGIN

DECLARE @dem int, @fine int

SELECT @dem = count(personID) FROM [LINKED\_CA].[CA].[dbo].[Person] WHERE personID = @personID;

if @dem < 1

print 'Cannot find this person!'

else

SELECT @fine = fine FROM [LINKED\_CA].[CA].[dbo].[Person] WHERE personID = @personID;

UPDATE [LINKED\_CA].[CA].[dbo].[Person] SET fine = @fine + 1 WHERE personID = @personID;

END

1. ***Procedure: showAll***

CREATE PROCEDURE showAll

AS

BEGIN

select P1.personID, P1.name, P1.DoB, P1.birthPlace, P1.currentPlace, P2.fine from Person as P1, [LINKED\_CA].[CA].[dbo].[Person] as P2 WHERE P1.personID = P2.personID

union all

select P1.personID, P1.name, P1.DoB, P1.birthPlace, P1.currentPlace, P2.fine from [LINKED\_SG].[SG].[dbo].[Person] as P1, [LINKED\_CA].[CA].[dbo].[Person] as P2 WHERE P1.personID = P2.personID

END

***At CA***

1. ***Procedure: AddLicense***

CREATE PROCEDURE AddLicense @driverID int, @personID int, @givenDate Date, @expiredDate Date, @licenseType varchar(3)

AS

BEGIN

DECLARE @dem int

SELECT @dem = count(driverID) FROM DriverLicense WHERE personID = @personID AND licenseType = @licenseType;

if @dem < 1

begin

INSERT INTO DriverLicense(driverID, personID, givenDate, licenseType, expiredDate) values (@driverID, @personID, @givenDate, @licenseType, @expiredDate);

end

else

print 'This person already have this license!'

END;

1. ***Procedure: UpdateExpiredDate***

CREATE PROCEDURE UpdateExpiredDate @driverID int, @newDate Date

AS

BEGIN

DECLARE @dem int

SELECT @dem = count(driverID) FROM DriverLicense WHERE driverID = @driverID;

if @dem < 1

print 'This license does not exist'

else

UPDATE DriverLicense SET expiredDate = @newDate WHERE driverID = @driverID;

END

1. ***Procedure: AddFine***

CREATE PROCEDURE AddFine @personID int

AS

BEGIN

DECLARE @dem int, @fine int

SELECT @dem = count(personID) FROM Person WHERE personID = @personID;

if @dem < 1

print 'Cannot find this person!'

else

SELECT @fine = fine FROM Person WHERE personID = @personID;

UPDATE Person SET fine = @fine + 1 WHERE personID = @personID;

END

1. ***Procedure: showAll***

CREATE PROCEDURE showAll

AS

BEGIN

select P1.personID, P1.name, P1.DoB, P1.birthPlace, P1.currentPlace, P2.fine from [LINKED\_HN].[HN].[dbo].[Person] as P1, Person as P2 WHERE P1.personID = P2.personID

union all

select P1.personID, P1.name, P1.DoB, P1.birthPlace, P1.currentPlace, P2.fine from [LINKED\_SG].[SG].[dbo].[Person] as P1, Person as P2 WHERE P1.personID = P2.personID

END

1. ***Procedure: ViewPerson***

CREATE PROCEDURE ViewPerson @personID int

AS

BEGIN

DECLARE @dem int, @name varchar(10), @DoB Date

SELECT @dem = COUNT(personID) FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

SELECT @personID = personID, @name = name, @DoB = DoB FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

print 'ID: ' + CAST(@personID as varchar)

print 'Name: ' + CAST(@name as varchar)

print 'Birthday: ' + CAST(@DoB as varchar)

print 'Person was born in Sai Gon.'

end

ELSE

begin

SELECT @dem = COUNT(personID) FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

SELECT @personID = personID, @name = name, @DoB = DoB FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

print 'ID: ' + CAST(@personID as varchar)

print 'Name: ' + @name

print 'Birthday: ' + CAST(@DoB as varchar)

print 'Person was born in Ha Noi.'

end

else

begin

print 'This PersonID does not exist!'

end

end

END;

1. ***Procedure: DeletePerson***

CREATE PROCEDURE DeletePerson @personID int

AS

BEGIN

DECLARE @dem int

SELECT @dem = COUNT(personID) FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

DELETE FROM [LINKED\_SG].[SG].[dbo].[Person] WHERE personID = @personID;

print 'Person is deleted.'

end

else

begin

SELECT @dem = COUNT(personID) FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

if @dem > 0

begin

DELETE FROM [LINKED\_HN].[HN].[dbo].[Person] WHERE personID = @personID;

print 'Person is deleted.'

end

else

print 'Person does not exist!'

end

END;

1. ***Procedure: AddLocation***

CREATE PROCEDURE AddLocation @locationID int, @city varchar(20), @district varchar(20)

AS

BEGIN

IF @locationID < 2000 and @city = 'Sai Gon'

INSERT INTO [LINKED\_SG].[SG].[dbo].[Location] values(@locationID, @city, @district);

ELSE

begin

IF @locationID < 3000 and @city = 'Ha Noi'

INSERT INTO [LINKED\_HN].[HN].[dbo].[Location] values(@locationID, @city, @district);

end

END;

1. ***Procedure: ViewLocation***

CREATE PROCEDURE ViewLocation @locationID int

AS

BEGIN

declare @dem int, @city varchar(20), @district varchar(20)

SELECT @dem = count(locationID) from [LINKED\_HN].[HN].[dbo].[Location] where locationID = @locationID;

if @dem > 0

begin

SELECT @city = city, @district = district from [LINKED\_HN].[HN].[dbo].[Location] where locationID = @locationID;

print 'City: ' + @city + '. District: ' + @district

end

else

begin

SELECT @dem = count(locationID) from [LINKED\_SG].[SG].[dbo].[Location] where locationID = @locationID;

if @dem > 0

begin

SELECT @city = city, @district = district from [LINKED\_SG].[SG].[dbo].[Location] where locationID = @locationID;

print 'City: ' + @city + '. District: ' + @district

end

else

print 'Cannot find the city'

end

END;

***Some example data:***

1. ***SG:***

exec AddPerson 113, 'HL22', '1997-11-11', 2001, 1001

exec AddPerson 223, 'HLlivesInSG', '1997-11-11', 1001, 1001

exec AddLocation 2222, 'Ha Noi', 'adf'

exec ViewLocation 2222

exec AddLicense 3, 113, '2014-09-09', '2020-09-09', 'C'

exec UpdateExpiredDate 5, '2030-01-12'

exec AddFine 113

1. ***HN***

exec ViewPerson 555

exec AddPerson 113, 'HL22', '1997-11-11', 2001, 1001

exec AddPerson 223, 'HLlivesInSG', '1997-11-11', 1001, 1001

exec AddLocation 2222, 'Ha Noi', 'adf'

exec ViewLocation 1001

exec AddLicense 555, 113, '2014-09-09', '2020-09-09', 'C'

exec UpdateExpiredDate 5, '2030-01-12'

exec AddFine 113

exec showAll

exec AddPerson 999, 'HL99', '1997-11-11', 2001, 1001

exec AddLicense 5, 999, '2014-09-09', '2020-09-09', 'A1'

select \* from [LINKED\_SG].[SG].[dbo].[Location]

insert into person values (12,'abby','1999-1-1',2001,1001)

delete from person where name='abby'

delete from person where name='Khoa2'

1. ***CA***

exec UpdateExpiredDate 1, '2030-01-12'

exec AddFine 113

exec showAll

exec AddLocation 2005, 'Sai Gon', 'Thu Duc'

exec AddLocation 1001, 'Sai Gon', 'Binh Thanh'

exec ViewLocation 2222

select \* from [LINKED\_SG].[SG].[dbo].[Person]

select \* from [LINKED\_SG].[SG].[dbo].[Location]

select \* from [LINKED\_HN].[HN].[dbo].[Location]

select \* from [LINKED\_SG].[SG].[dbo].[Person]

select \* from [LINKED\_HN].[HN].[dbo].[Person]

select \* from person