2020

Bachelor of Information Technology BAIT

MS SQL Server Administration Assignment F19

Manufacturing Sub-System

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Prepared by:

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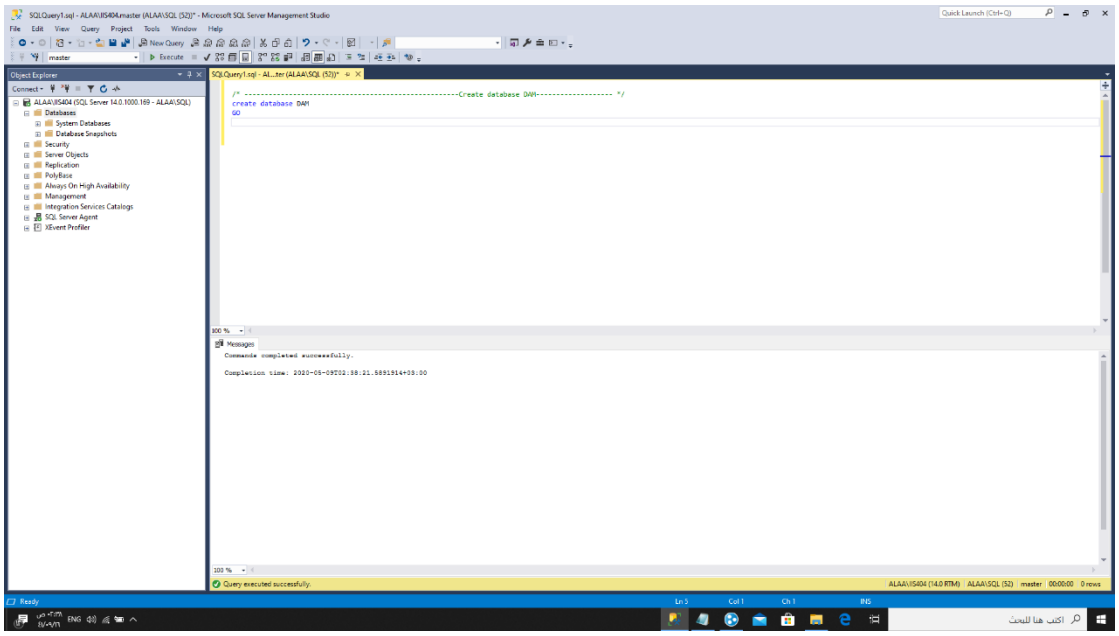
Content

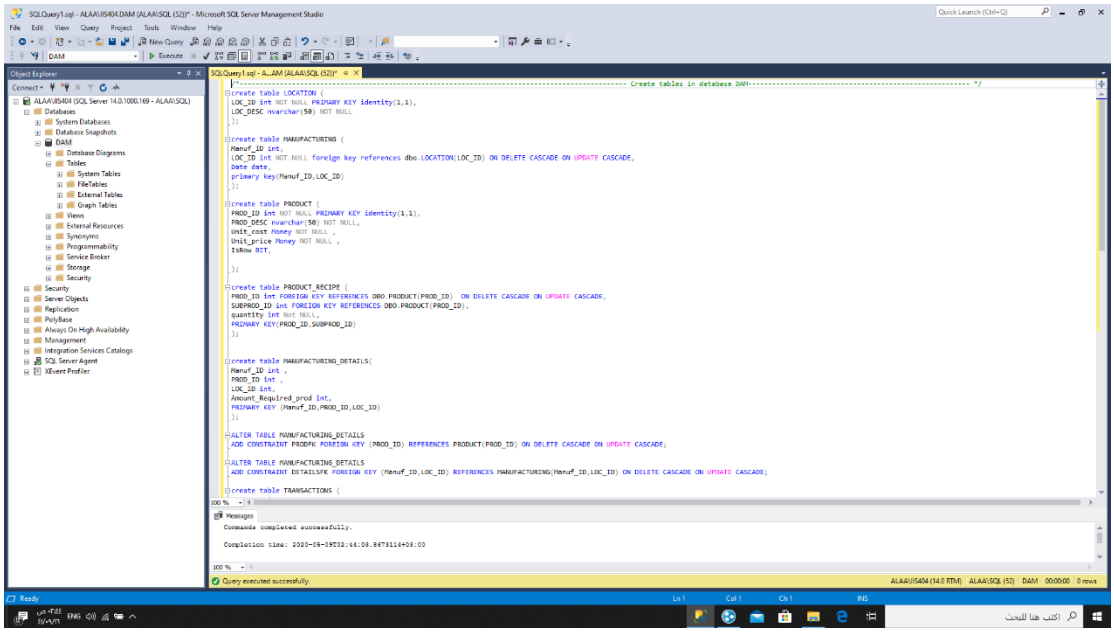
1. Database creation using

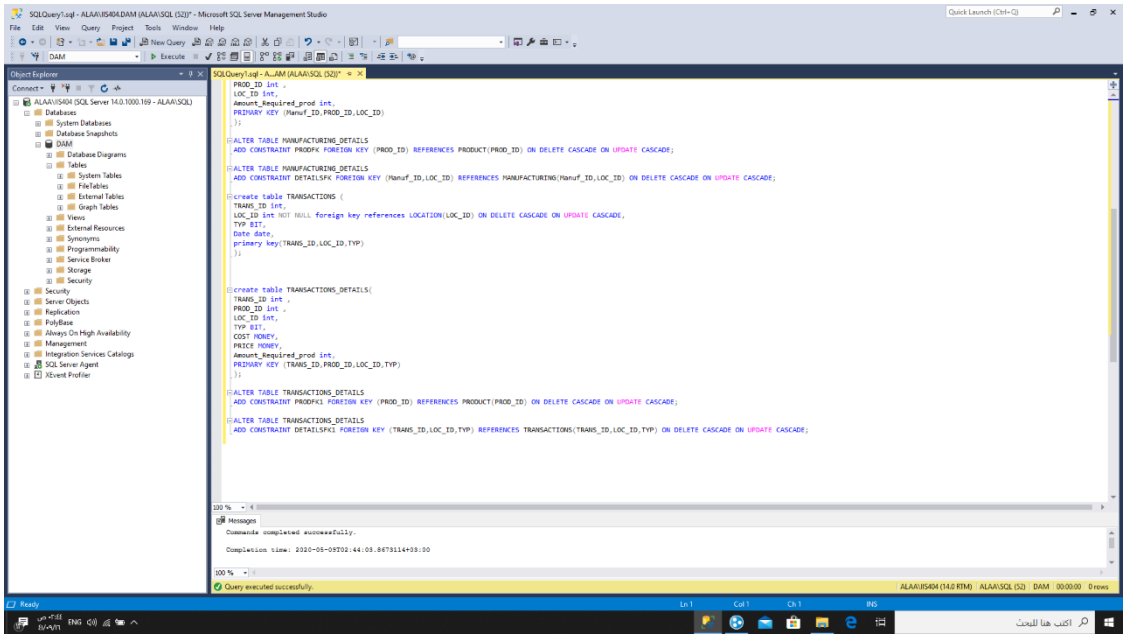
1.1. Database creation



```
/* ---------------------------------Create database DAM------------------- */
create database DAM
GO
USE DAM
```

1.2. Tables and details tables creation

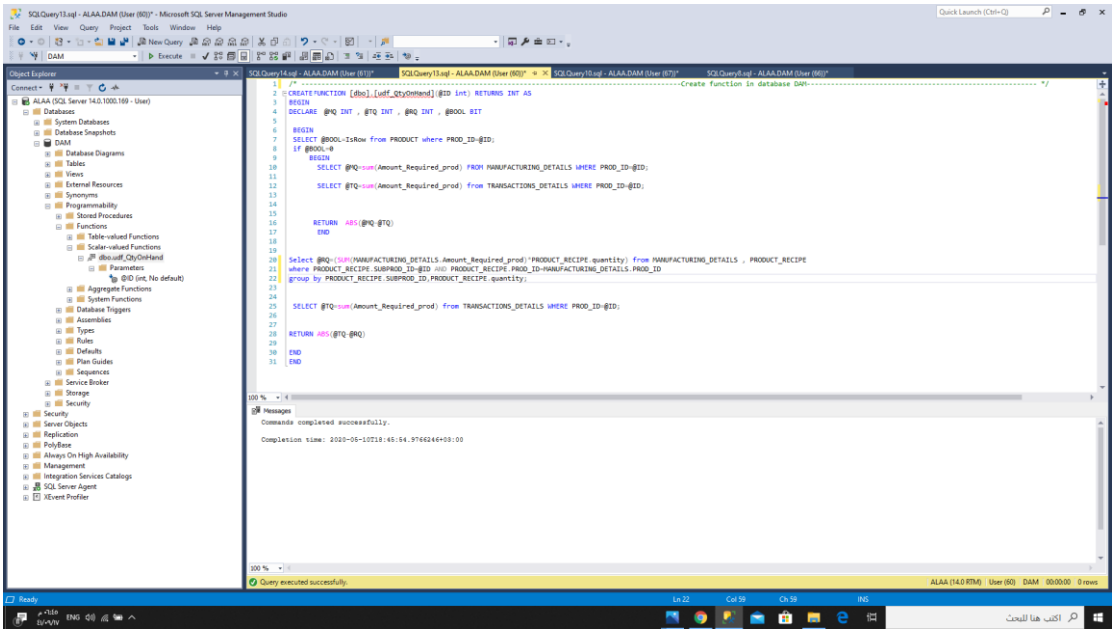


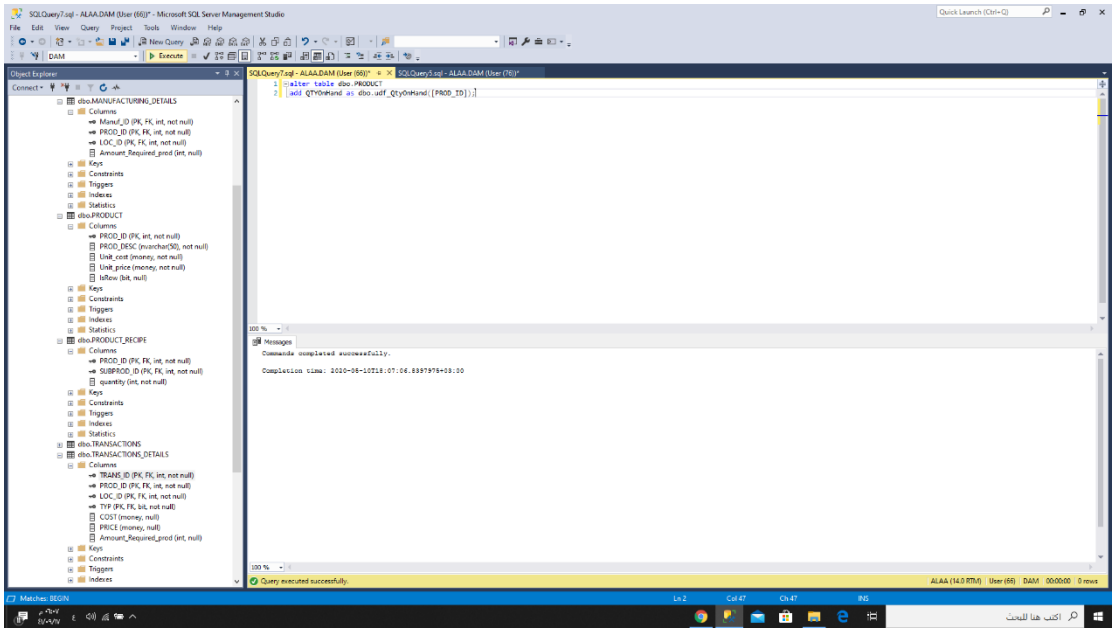


```
/*----------------------- Create tables in database DAM------------------ */
create table LOCATION (
LOC_ID int NOT NULL PRIMARY KEY identity(1,1),
LOC_DESC nvarchar(50) NOT NULL
);

create table MANUFACTURING (
Manuf_ID int,
LOC_ID int NOT NULL foreign key references dbo.LOCATION(LOC_ID) ON DELETE
CASCADE ON UPDATE CASCADE,
Date date,
primary key(Manuf_ID,LOC_ID)
);

create table PRODUCT (
```

```
PROD_ID int NOT NULL PRIMARY KEY identity(1,1),
PROD_DESC nvarchar(50) NOT NULL,
Unit_cost Money NOT NULL ,
Unit_price Money NOT NULL ,
IsRow BIT,

);
create table PRODUCT_RECIPE (
PROD_ID int FOREIGN KEY REFERENCES DBO.PRODUCT(PROD_ID)  ON DELETE CASCADE ON
UPDATE CASCADE,
SUBPROD_ID int FOREIGN KEY REFERENCES DBO.PRODUCT(PROD_ID),
quantity int Not NULL,
PRIMARY KEY(PROD_ID,SUBPROD_ID)
);
create table MANUFACTURING_DETAILS(
Manuf_ID int ,
PROD_ID int ,
LOC_ID int,
Amount_Required_prod int,
PRIMARY KEY (Manuf_ID,PROD_ID,LOC_ID)
);

ALTER TABLE MANUFACTURING_DETAILS
ADD CONSTRAINT PRODFK FOREIGN KEY (PROD_ID) REFERENCES PRODUCT(PROD_ID) ON
DELETE CASCADE ON UPDATE CASCADE;

ALTER TABLE MANUFACTURING_DETAILS
ADD CONSTRAINT DETAILSFK FOREIGN KEY (Manuf_ID,LOC_ID) REFERENCES
MANUFACTURING(Manuf_ID,LOC_ID) ON DELETE CASCADE ON UPDATE CASCADE;

create table TRANSACTIONS (
TRANS_ID int,
LOC_ID int NOT NULL foreign key references LOCATION(LOC_ID) ON DELETE CASCADE
ON UPDATE CASCADE,
TYP BIT,
Date date,
primary key(TRANS_ID,LOC_ID,TYP)
);

create table TRANSACTIONS_DETAILS(
TRANS_ID int ,
PROD_ID int ,
LOC_ID int,
TYP BIT,
COST MONEY,
PRICE MONEY,
Amount_Required_prod int,
PRIMARY KEY (TRANS_ID,PROD_ID,LOC_ID,TYP)
);

ALTER TABLE TRANSACTIONS_DETAILS
ADD CONSTRAINT PRODFK1 FOREIGN KEY (PROD_ID) REFERENCES PRODUCT(PROD_ID) ON
DELETE CASCADE ON UPDATE CASCADE;

ALTER TABLE TRANSACTIONS_DETAILS
ADD CONSTRAINT DETAILSFK1 FOREIGN KEY (TRANS_ID,LOC_ID,TYP) REFERENCES
TRANSACTIONS(TRANS_ID,LOC_ID,TYP) ON DELETE CASCADE ON UPDATE CASCADE;
```

1.3. Qty on hand Function and computed columns





```
/* ------------------------Create function in database DAM---------------------- */
create FUNCTION [dbo].[udf_QtyOnHand](@ID int) RETURNS INT AS
BEGIN
DECLARE @MQ INT , @TQ INT , @RQ INT , @BOOL BIT

 BEGIN
 SELECT @BOOL=IsRow from PRODUCT where PROD_ID=@ID;
 if @BOOL=0   /*  [0 Manufactured , 1 Raw] */
     BEGIN
       SELECT @MQ=sum(Amount_Required_prod) FROM MANUFACTURING_DETAILS WHERE
PROD_ID=@ID;

         SELECT @TQ=sum(Amount_Required_prod) from TRANSACTIONS_DETAILS WHERE
PROD_ID=@ID;
```

```
      RETURN ABS(@MQ-@TQ)
       END


Select @RQ=(SUM(MANUFACTURING_DETAILS.Amount_Required_prod) *PRODUCT_RECIPE.quantity)
from MANUFACTURING_DETAILS , PRODUCT_RECIPE
where PRODUCT_RECIPE.SUBPROD_ID=@ID AND
PRODUCT_RECIPE.PROD_ID=MANUFACTURING_DETAILS.PROD_ID
group by PRODUCT_RECIPE.SUBPROD_ID, PRODUCT_RECIPE.quantity;


 SELECT @TQ=sum(Amount_Required_prod) from TRANSACTIONS_DETAILS WHERE PROD_ID=@ID;


RETURN ABS(@TQ-@RQ)

END
END
```

Function result:

example:

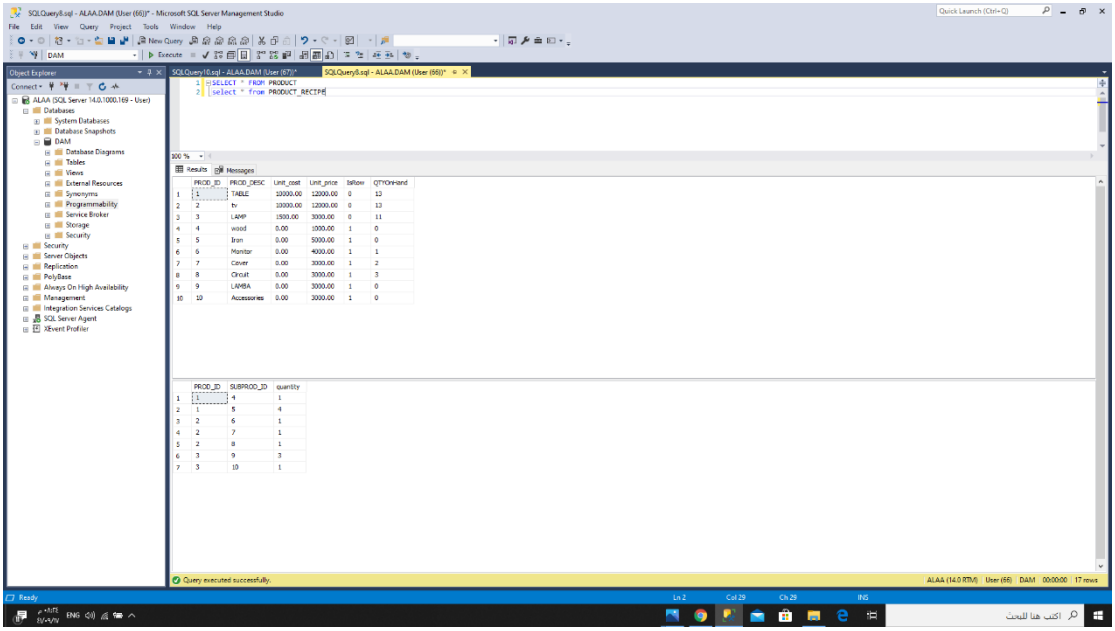
Product: PROD_ID=1, PROD_DESC='TABLE', IsRaw=0 [Manufactured]

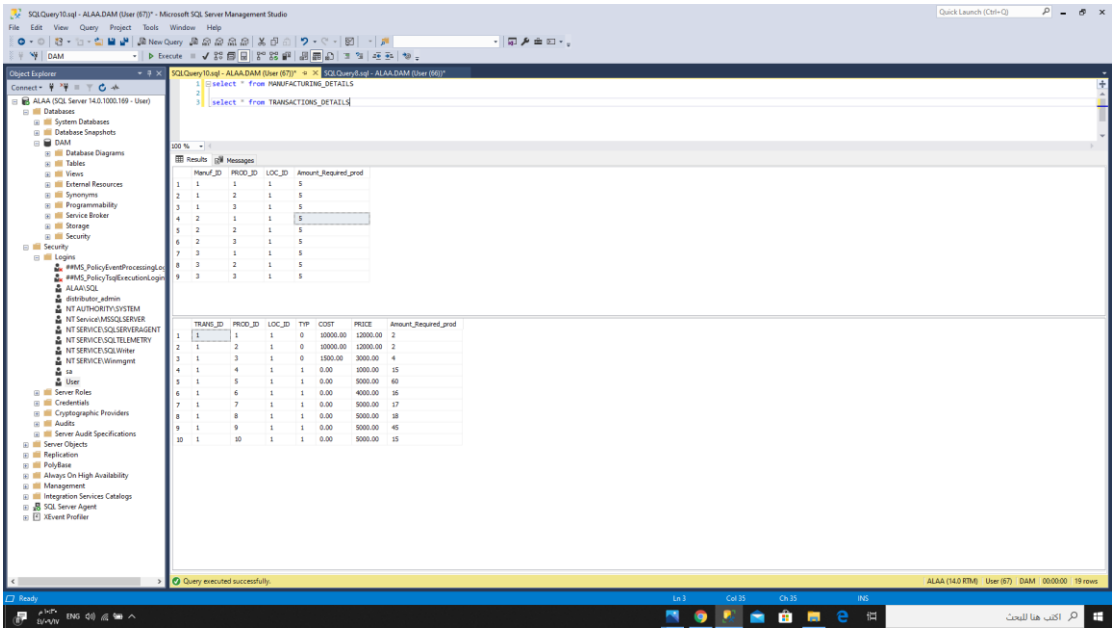
Each 'TABLE' contain [SUB-Product from it]: (1) SUBPROD_ID=4, PROD_DESC='Wood', Quantity=1 [Raw]
(2) SUBPROD_ID=5, PROD_DESC='Iron', Quantity=4 [Raw]

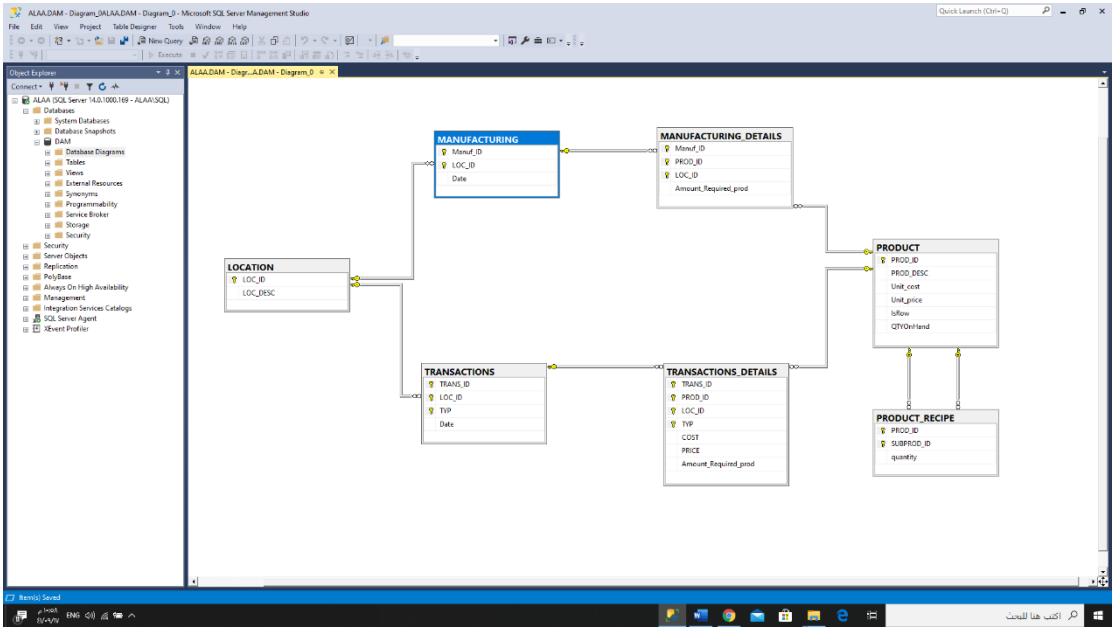
In MANUFACTURING_DETAILS: all (Amount_Required_prod) from 'TABLE'= 15

In TRANSACTIONS_DETAILS: all (Amount_Required_prod) from 'TABLE'= 2 [Sale]
all (Amount_Required_prod) from 'Wood'= 15 [Purchase]
all (Amount_Required_prod) from 'Iron'= 60 [Purchase]

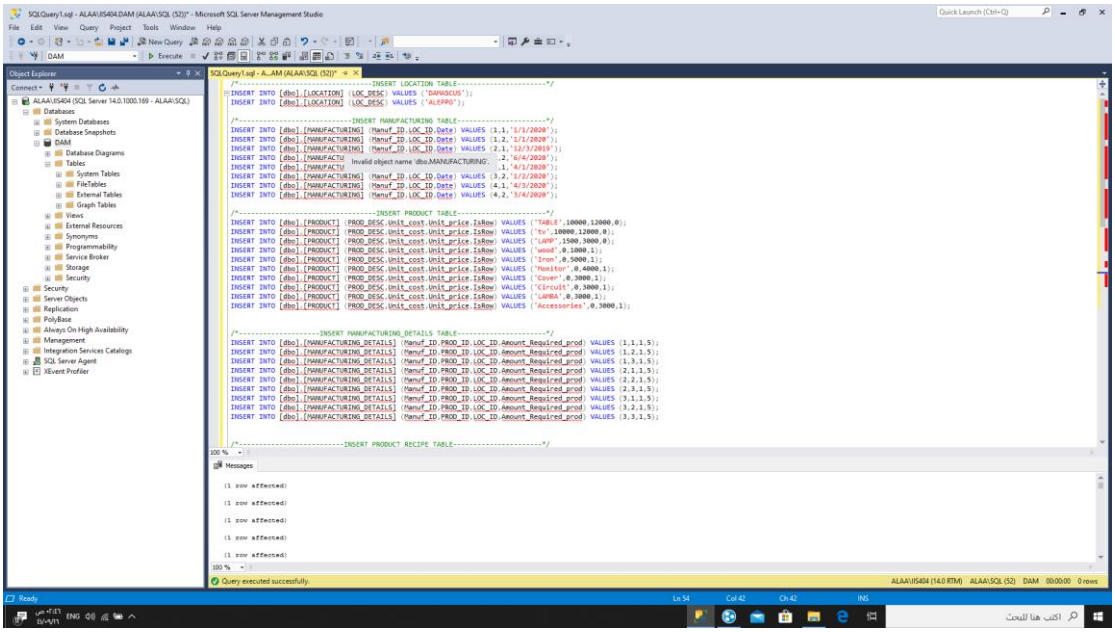
Hence, it should remain (13) table, (0) Wood, (0) Iron

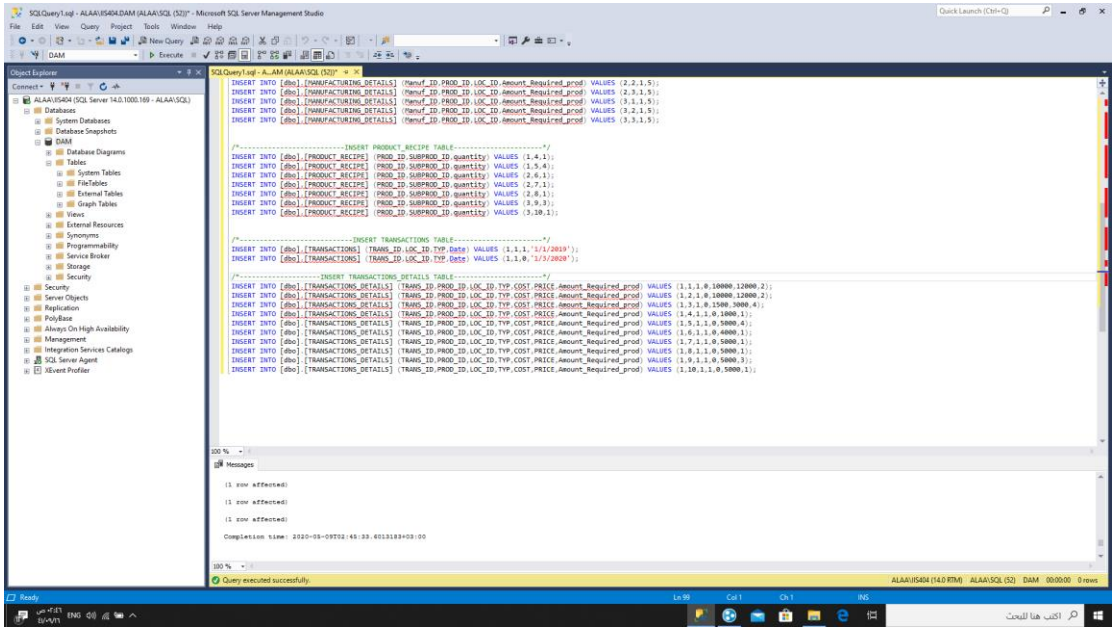

SQLQuery8.sql - ALAA.DAM (User (66))* - Microsoft SQL Server Management Studio
SELECT * FROM PRODUCT
select * from PRODUCT_RECIPE
PROD_ID PROD_DESC Unit_cost Unit_price IsItem QTYOnHand
1 TABLE 10000.00 12000.00 0 13
2 tv 10000.00 12000.00 0 13
3 LAMP 1500.00 3000.00 0 11
4 wood 0.00 1000.00 1 0
5 Iron 0.00 5000.00 1 0
6 Monitor 0.00 4000.00 1 1
7 Cover 0.00 3000.00 1 2
8 Circuit 0.00 3000.00 1 3
9 LAMBA 0.00 3000.00 1 0
10 Accessories 0.00 3000.00 1 0
PROD_ID SUBPROD_ID quantity
1 4 1
1 5 4
2 6 1
2 7 1
2 8 1
3 9 3
3 10 1
Query executed successfully.


SQLQuery10.sql - ALAA.DAM (User (67))* - Microsoft SQL Server Management Studio
select * from MANUFACTURING_DETAILS
select * from TRANSACTIONS_DETAILS
Manuf_ID PROD_ID LOC_ID Amount_Required_prod
1 1 1 5
1 2 1 5
1 3 1 5
2 1 1 5
2 2 1 5
2 3 1 5
3 1 1 5
3 2 1 5
3 3 1 5
TRANS_ID PROD_ID LOC_ID TYP COST PRICE Amount_Required_prod
1 1 1 0 10000.00 12000.00 2
1 2 1 0 10000.00 12000.00 2
1 3 1 0 1500.00 3000.00 4
1 4 1 1 0.00 1000.00 15
1 5 1 1 0.00 5000.00 60
1 6 1 1 0.00 4000.00 16
1 7 1 1 0.00 5000.00 17
1 8 1 1 0.00 5000.00 18
1 9 1 1 0.00 5000.00 45
1 10 1 1 0.00 5000.00 15
Query executed successfully.



1.4. Filling data





```
/*---------------------------------INSERT LOCATION TABLE---------------------*/
INSERT INTO [dbo].[LOCATION] (LOC_DESC) VALUES ('DAMASCUS');
INSERT INTO [dbo].[LOCATION] (LOC_DESC) VALUES ('ALEPPO');

/*---------------------------INSERT MANUFACTURING TABLE---------------------*/
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(1,1,'1/1/2020');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(1,2,'1/1/2020');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(2,1,'12/3/2019');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(2,2,'6/4/2020');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(3,1,'4/1/2020');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(3,2,'1/2/2020');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(4,1,'4/3/2020');
INSERT INTO [dbo].[MANUFACTURING] (Manuf_ID,LOC_ID,Date) VALUES
(4,2,'3/4/2020');

/*---------------------------------INSERT PRODUCT TABLE---------------------*/
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('TABLE',10000,12000,0);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('tv',10000,12000,0);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('LAMP',1500,3000,0);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('wood',0,1000,1);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('Iron',0,5000,1);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('Monitor',0,4000,1);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('Cover',0,3000,1);
```

```
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('Circuit',0,3000,1);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('LAMBA',0,3000,1);
INSERT INTO [dbo].[PRODUCT] (PROD_DESC,Unit_cost,Unit_price,IsRow) VALUES
('Accessories',0,3000,1);


/*--------------------INSERT MANUFACTURING_DETAILS TABLE----------------------*/
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (1,1,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (1,2,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (1,3,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (2,1,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (2,2,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (2,3,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (3,1,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (3,2,1,5);
INSERT INTO [dbo].[MANUFACTURING_DETAILS]
(Manuf_ID,PROD_ID,LOC_ID,Amount_Required_prod) VALUES (3,3,1,5);


/*--------------------------INSERT PRODUCT_RECIPE TABLE----------------------*/
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES (1,4,1);
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES (1,5,4);
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES (2,6,1);
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES (2,7,1);
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES (2,8,1);
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES (3,9,3);
INSERT INTO [dbo].[PRODUCT_RECIPE] (PROD_ID,SUBPROD_ID,quantity) VALUES
(3,10,1);


/*---------------------------INSERT TRANSACTIONS TABLE----------------------*/
INSERT INTO [dbo].[TRANSACTIONS] (TRANS_ID,LOC_ID,TYP,Date) VALUES
(1,1,1,'1/1/2019');
INSERT INTO [dbo].[TRANSACTIONS] (TRANS_ID,LOC_ID,TYP,Date) VALUES
(1,1,0,'1/3/2020');


/*--------------------INSERT TRANSACTIONS_DETAILS TABLE----------------------*/
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,1,1,0,10000,12000,2);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,2,1,0,10000,12000,2);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,3,1,0,1500,3000,4);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,4,1,1,0,1000,15);
```

```
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,5,1,1,0,5000,60);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,6,1,1,0,4000,16);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,7,1,1,0,5000,17);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,8,1,1,0,5000,18);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,9,1,1,0,5000,45);
INSERT INTO [dbo].[TRANSACTIONS_DETAILS]
(TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod) VALUES
(1,10,1,1,0,5000,15);
```

2. Synchronization

Discussing the Options

Depending on the factory system: database in Head office located in Damascus (DAM) in which card declarations, manufacturing and inbound/outbound transactions take place, and a branch in Aleppo (ALP), in which there's no card declaration but manufacturing and transactions.

I need to create a solution that synchronizes the data up and down between the (HO) (DAM) and a branch in Aleppo (ALP), in the following manner:

- ✓ In (DAM), users declare Product & Location cards, as well as BOM, those cards should be synchronized automatically to low level (ALP), and also there are manufacturing and inbound/outbound transactions.

  [Product, Prouduct_Recipe and Location should match but synchronized only from DAM to ALP **(one-way).]**

- ✓ Inbound and outbound Transactions, also take place in (ALP) then they should be automatically synchronized with upper level (DAM).

  [at every moment the Transactions and manufacturing with their details should match in DAM & ALP **(bidirectional).]**

2.1. Log shipping (DR almost)

It is **not suitable** for the mentioned manufacturing system for the following reasons:

- Log shipping is always asynchrony. Log shipping totally depends on the log backup and restore schedule.
- T-Logs are backed up and transferred to secondary server
- All committed and un-committed transaction are transferred
- In log shipping the secondary database will be in Read-only mode so that it can be used for reporting purposes.
- Usage Scenario:
  i. You can cope up with a longer down time.
  ii. You have limited investments in terms of shared storage, switches, etc.

Our system needs the synchronization to work up and down and data synchronization should be defined by requirements & DBA. Also, The Subscriber Database should open to reads and writes.

2.2. Replication: (DR and HA partially)

Replication is a set of technologies for copying and distributing data and database objects from one database to another and then **synchronizing between databases** to maintain consistency. Which suit perfectly our requested system.

So now I must choose one of the following replication technologies:

2.2.1. Snapshot replication

This is suitable when there fixed known times of changes to the database.

But our system is a critical database and its data records change frequently, whether in the cases of buying and selling or in cases of manufacturing and the change that occurs in the amount of materials and their entries, in this case, it is not suitable for our system.

2.2.2. Transactional replication

- used for the critical databases which require less downtime.
- It is useful when where data need on an incremental basis.
- It is useful for the database where a large amount of data changes frequently.
  It offers the ability that the same server can be a publisher for specific tables.

- I choose **Transaction Replication** on the follow tables: **(LOCATION,PRODUCT,PRODUCT_RECIPE)** because In the Transaction replication, all changes that occurred at the Publisher side (DAM -DB) after taking the snapshot will be copied and applied to the Subscriber side (ALP-DB) continuously. This is not the case with the Snapshot replication, where the next synchronization will occur when a new snapshot is taken from the Publisher side to be applied to the Subscriber again.

2.2.3. Merge replication

- Merge replication, like transactional replication, typically starts with a snapshot of the publication database objects and data.
- Subsequent data changes and schema modifications made at the Publisher and Subscribers are tracked with triggers.
- The Subscriber synchronizes with the Publisher when connected to the network and exchanges all rows that have changed between the Publisher and Subscriber since the last time synchronization occurred.
- In this technology, the synchronization works in both way but it makes both of the Publisher and the Subscriber have completely the same data.
- I choose **Merge Replication** on the follow tables:

  (MANUFACTURING – MANUFACTURING_DETAILS – TRANSACTION-TRANSACTION_DETAILS) because in the Merge replication, the Subscriber (ALP) will download a copy of the Publisher database (DAM) data and objects at first connect. When the Subscriber connects to the network again, it will upload all changes to the Publisher database then download all changes from the Publisher again, that are performed by Subscriber to keep the data synchronized and consistent.

2.3. Database mirroring

This is not required for our system because it is only intended to create a replica of a single production database. However, you may want to note, Microsoft is phasing out database mirroring in future versions of SQL Server. The recommended functional replacements are Basic Availability Groups or Always On Availability Groups.

3. DAM to ALP [Over internet]

Products, Prouduct_Recipe and Location should match but synchronized only from DAM to ALP **(one-way)**.

3.1. Pre-requisites

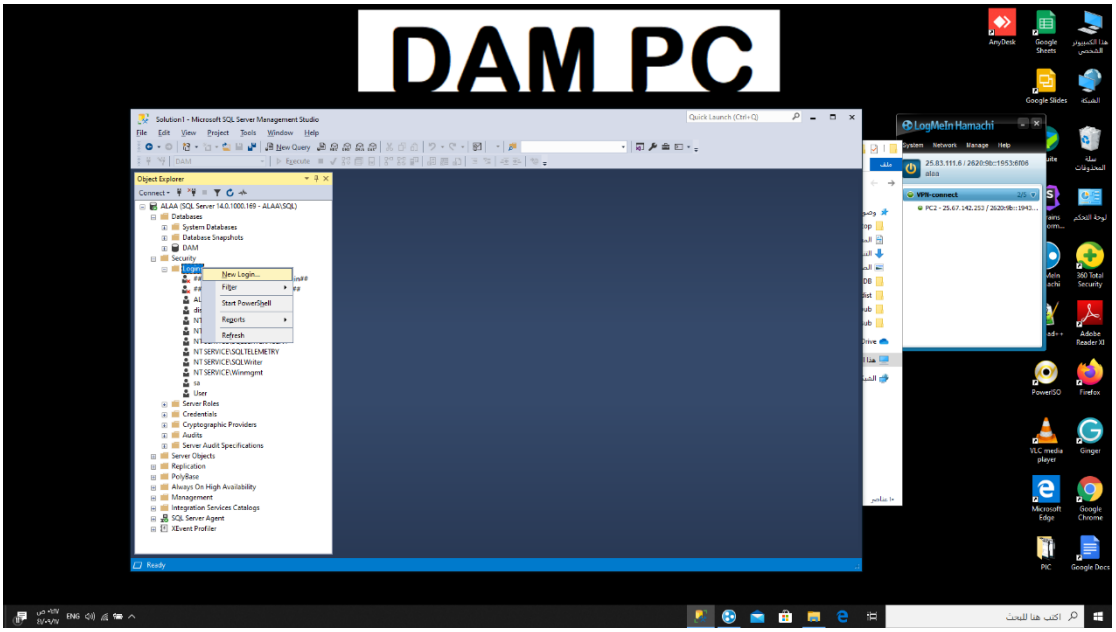
3.1.1. The account must at minimum be a member of the db_owner fixed database role in the SQL replication Publisher, Distributor and Subscriber databases

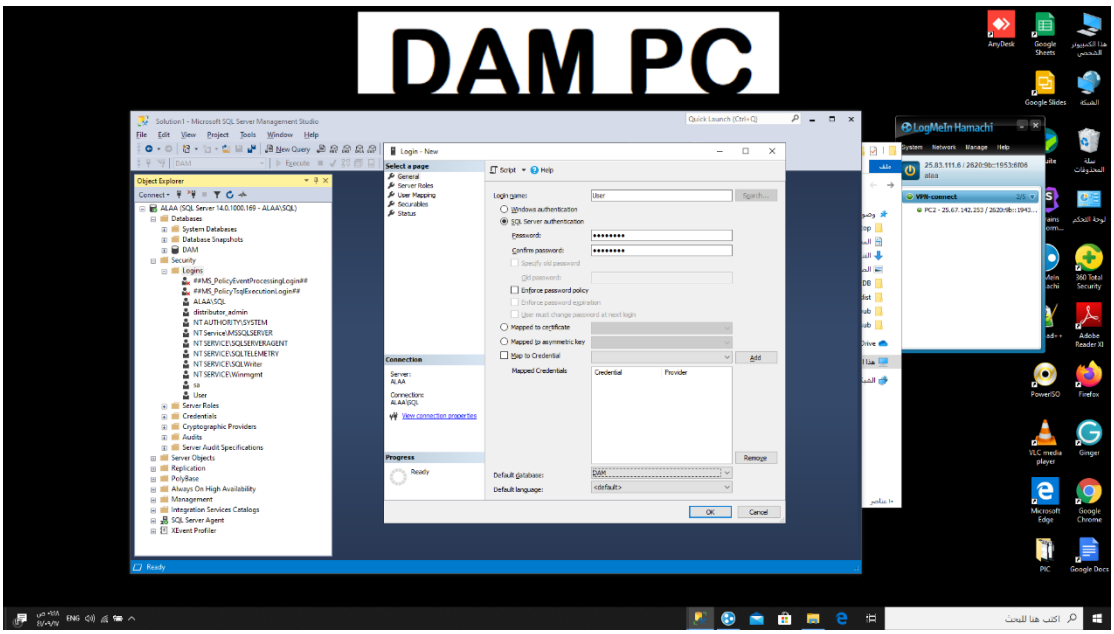
3.1.2. For securing the replication snapshot folder using a Snapshot Agent, the account must have read and write or modify permission on the replication snapshot share

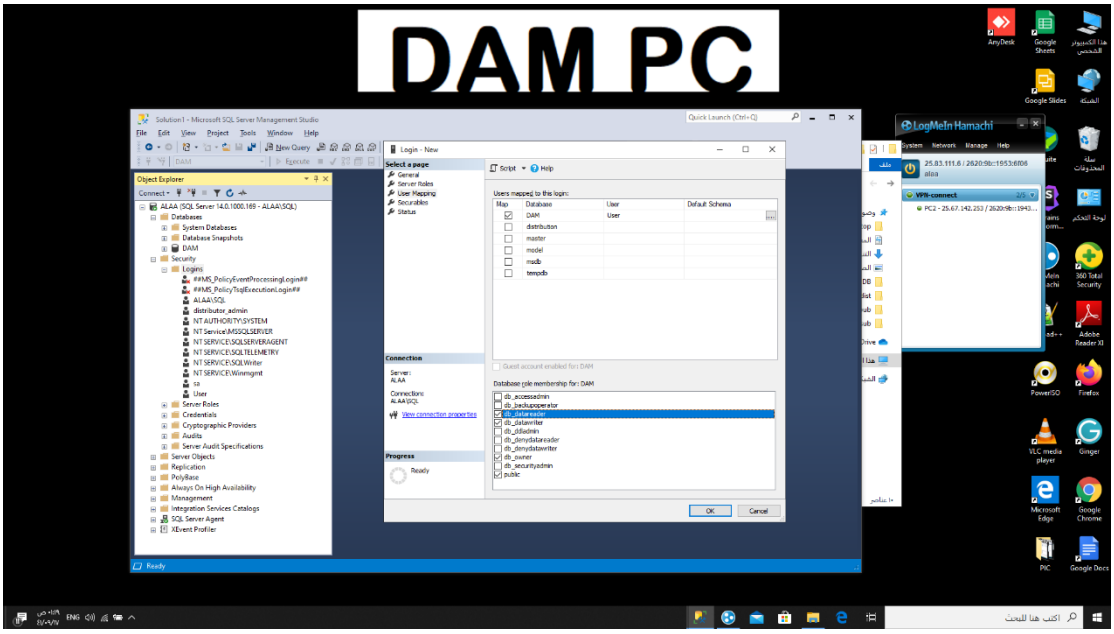
So, I created new login (SQL SERVER AUTHENTICATION) and name it [User]

Default database: DAM.

From User Mapping make [User] member of db_owner and give it (read\write) permission



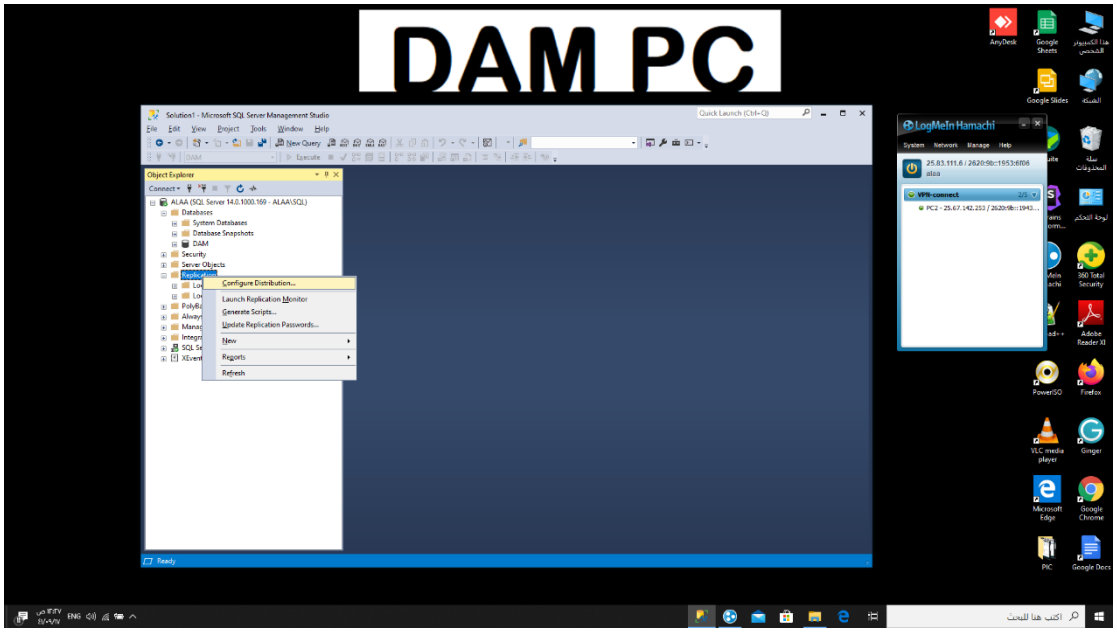


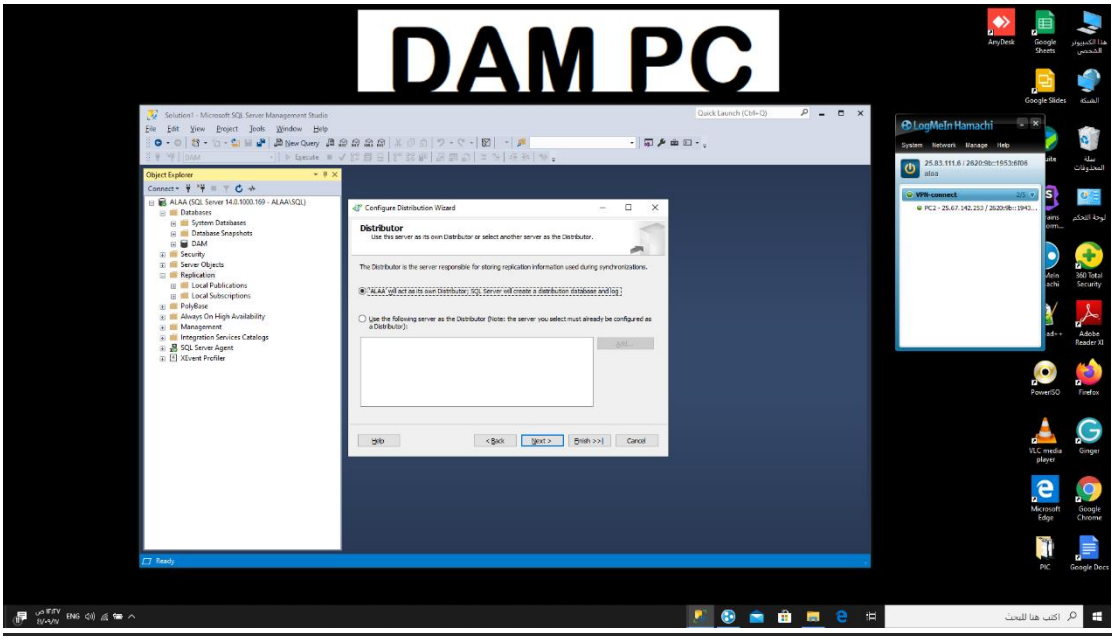


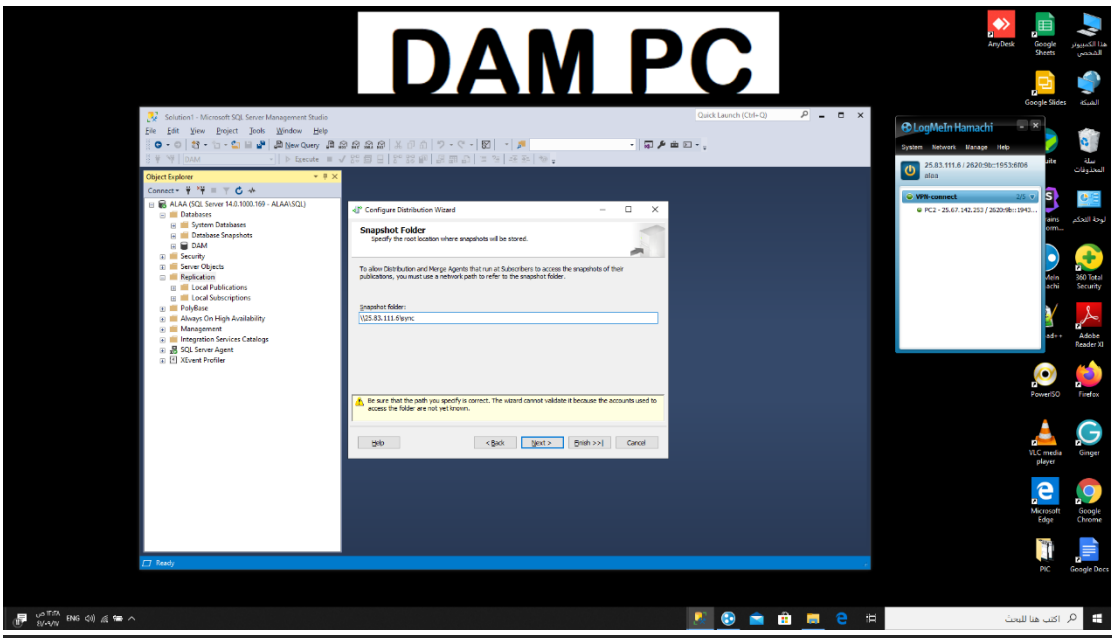
3.1.3. Prepare the replication snapshot folder

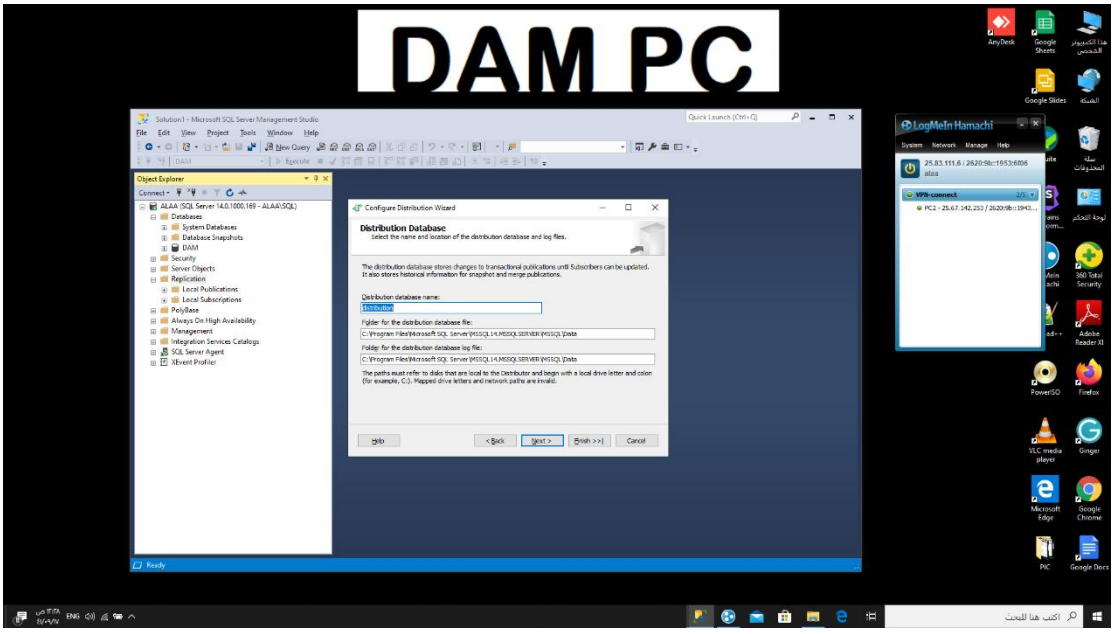
I changed the default path of snapshot folder to (\\25.83.111.6\sync) and make it shared.

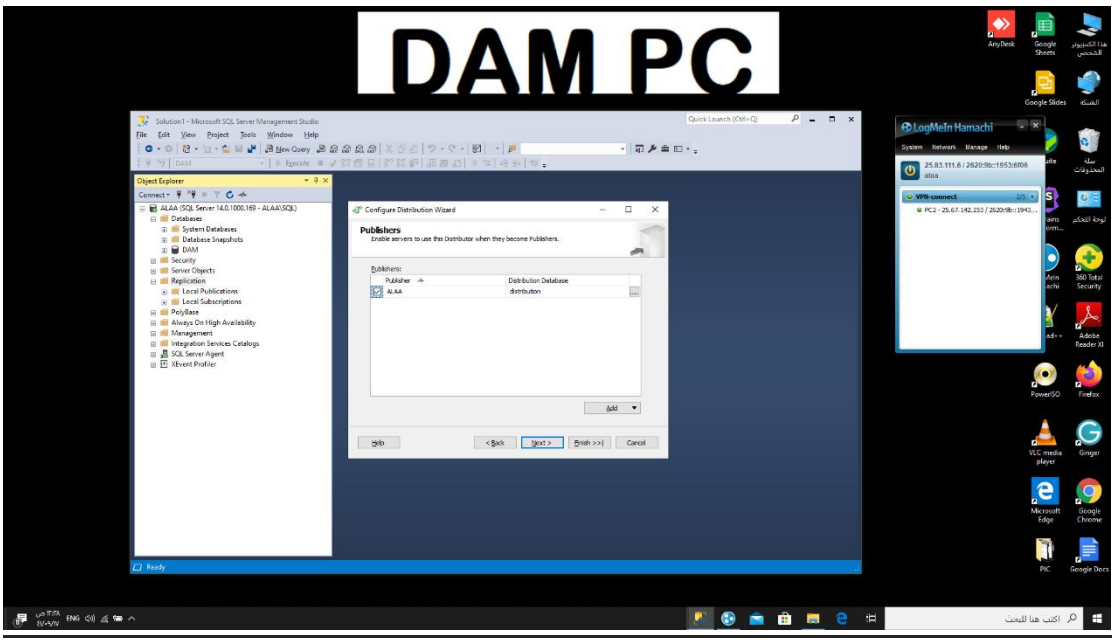
3.1.4. Configure a SQL replication distributor

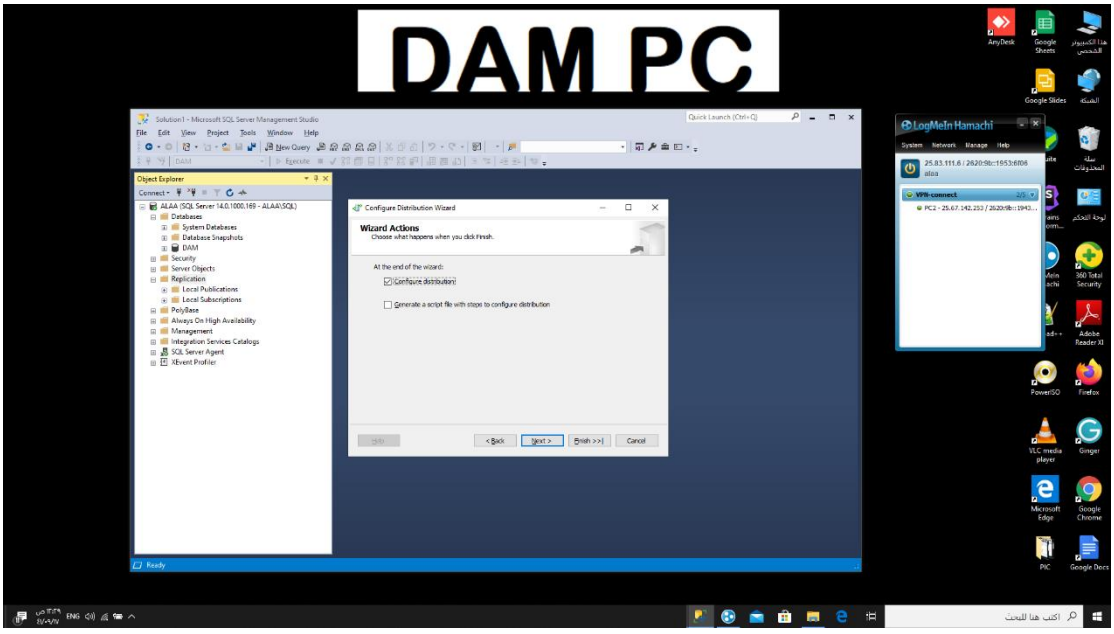


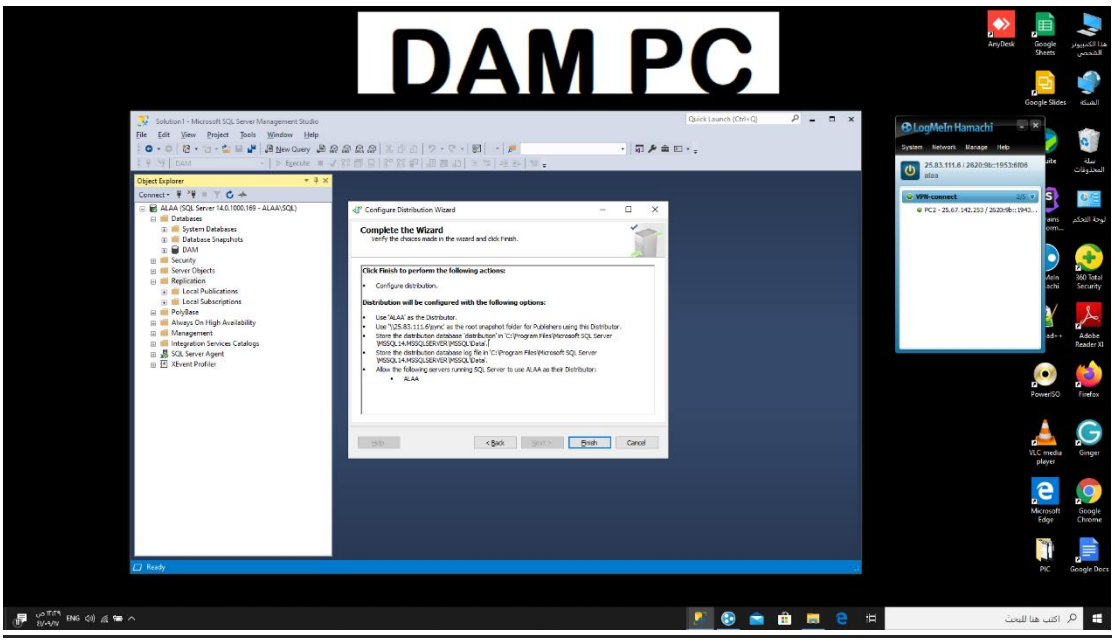


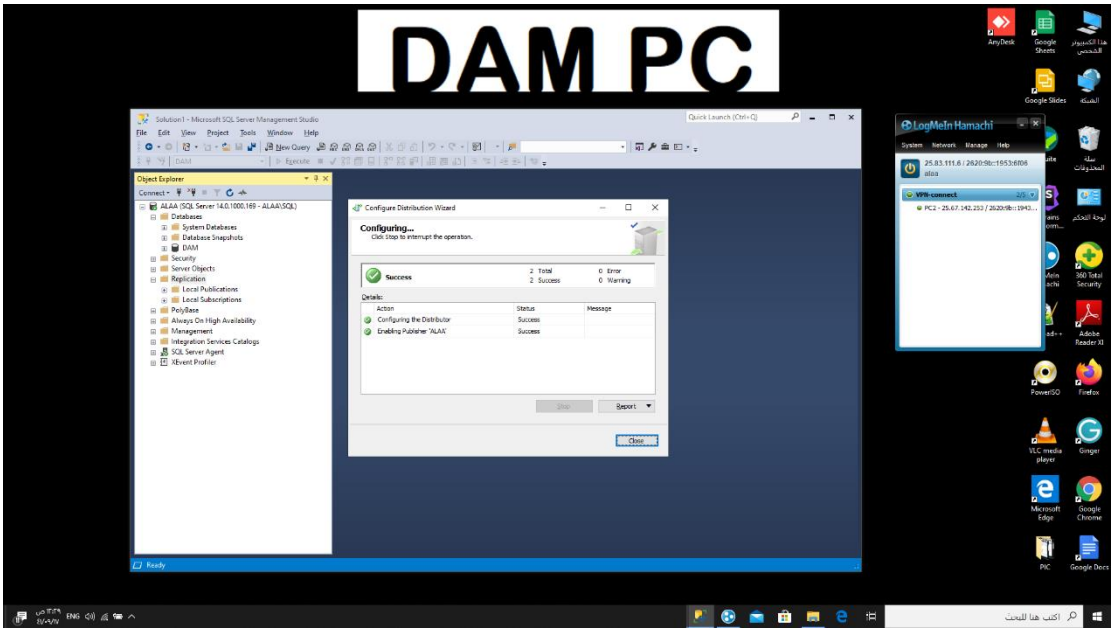

DAM PC
Configure Distribution Wizard
Snapshot Folder
Specify the root location where snapshots will be stored.
Snapshot folder:
\\25.83.111.6\sync
Help
< Back
Next >
Finish >>|
Cancel


DAM PC
Configure Distribution Wizard
Distribution Database
Select the name and location of the distribution database and log files.
Distribution database name:
Distribution
Help
< Back
Next >
Finish >>|
Cancel

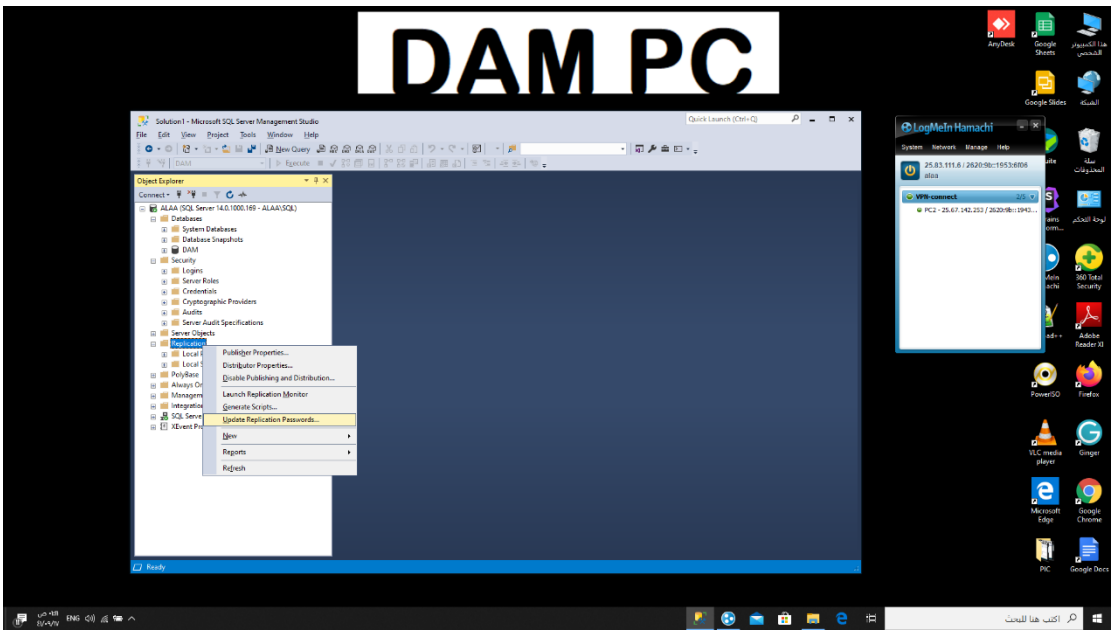

DAM PC
Configure Distribution Wizard
Publishers
Enable servers to use this Distributor when they become Publishers.
Publishers:
Publisher
Distribution Database
ALAA
distribution
Add
Help
< Back
Next >
Finish >>|
Cancel
Object Explorer
Connect
ALAA (SQL Server 14.0.1000.169 - ALAA\SQL)
Databases
System Databases
Database Snapshots
DAM
Security
Server Objects
Replication
Local Publications
Local Subscriptions
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
Ready
LogMeIn Hamachi
System
Network
Manage
Help
VPN-connect
اكتب هنا للبحث

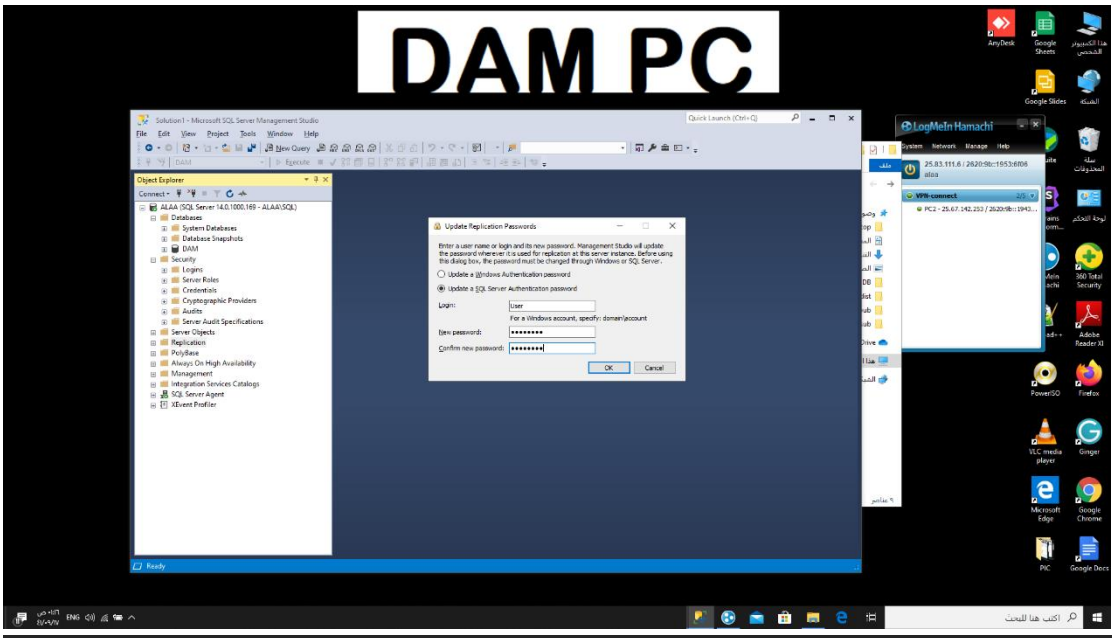

DAM PC
Configure Distribution Wizard
Wizard Actions
Choose what happens when you click Finish.
At the end of the wizard:
Configure distribution
Generate a script file with steps to configure distribution
< Back
Next >
Finish >>|
Cancel
Object Explorer
Connect
ALAA (SQL Server 14.0.1000.169 - ALAA\SQL)
Databases
System Databases
Database Snapshots
DAM
Security
Server Objects
Replication
Local Publications
Local Subscriptions
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
Ready
LogMeIn Hamachi
System
Network
Manage
Help
VPN-connect
اكتب هنا للبحث





I add the user (User) [update a SQL Server Authentication password]


DAM PC
Solution1 - Microsoft SQL Server Management Studio
Object Explorer
Publisher Properties...
Distributor Properties...
Disable Publishing and Distribution...
Launch Replication Monitor
Generate Scripts...
Update Replication Passwords...
New
Reports
Refresh
LogMeIn Hamachi

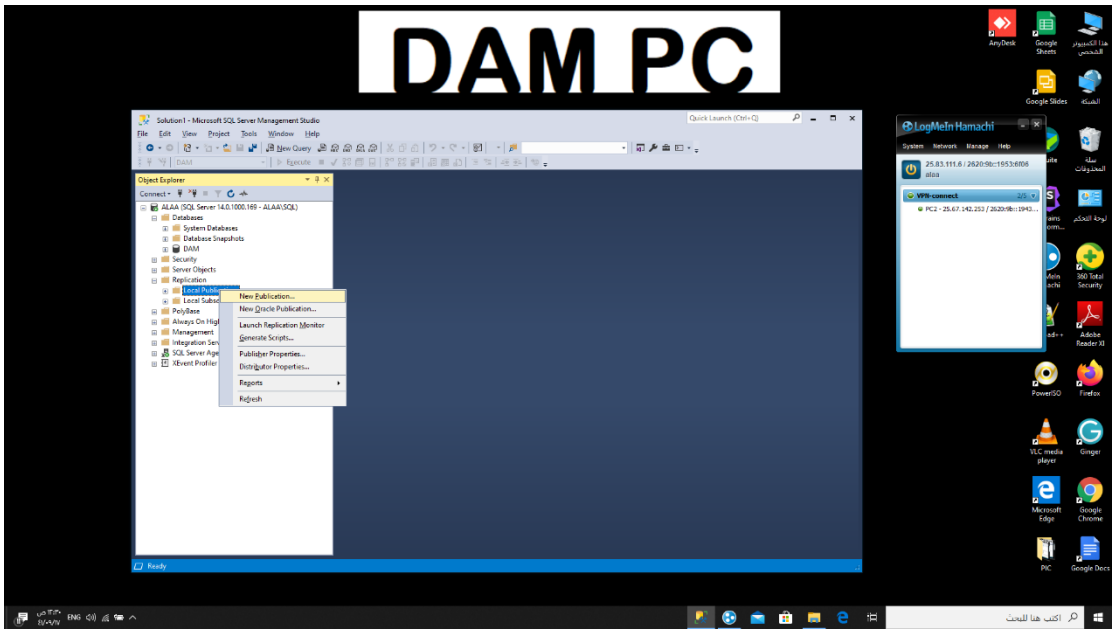

DAM PC
Update Replication Passwords
Update a Windows Authentication password
Update a SQL Server Authentication password
Login:
New password:
Confirm new password:
OK
Cancel
LogMeIn Hamachi

3.2. Create a SQL replication publisher

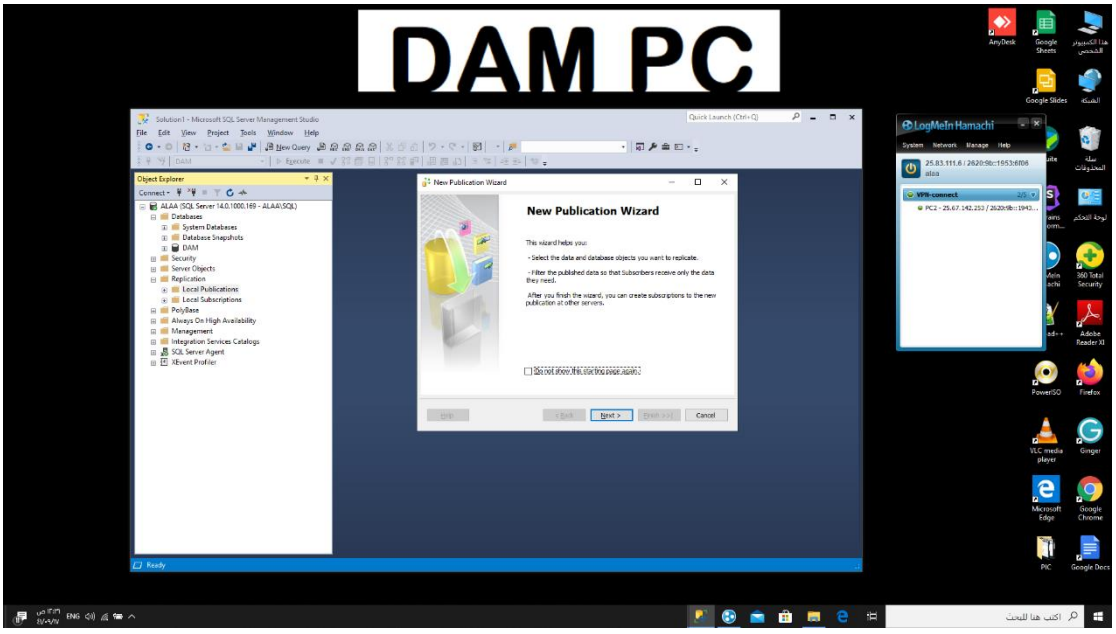
In the first laptop on server [ALAA] (HO DAMASCUS)

Windows account [ALAA\SQL]

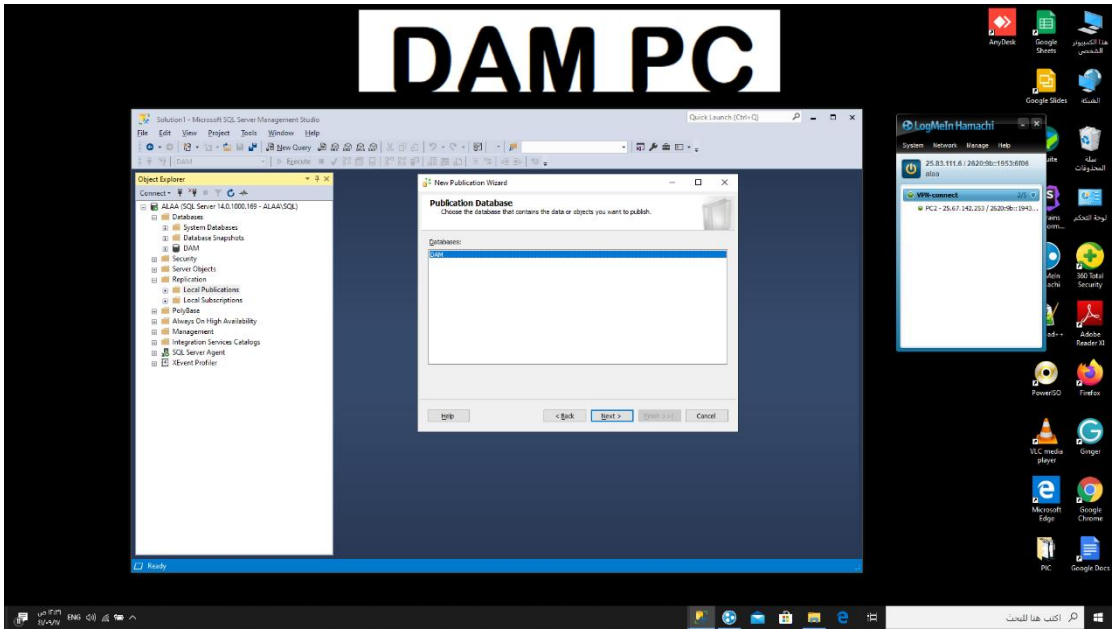
3.2.1. On the HO instance (DAM), create a new Publication .



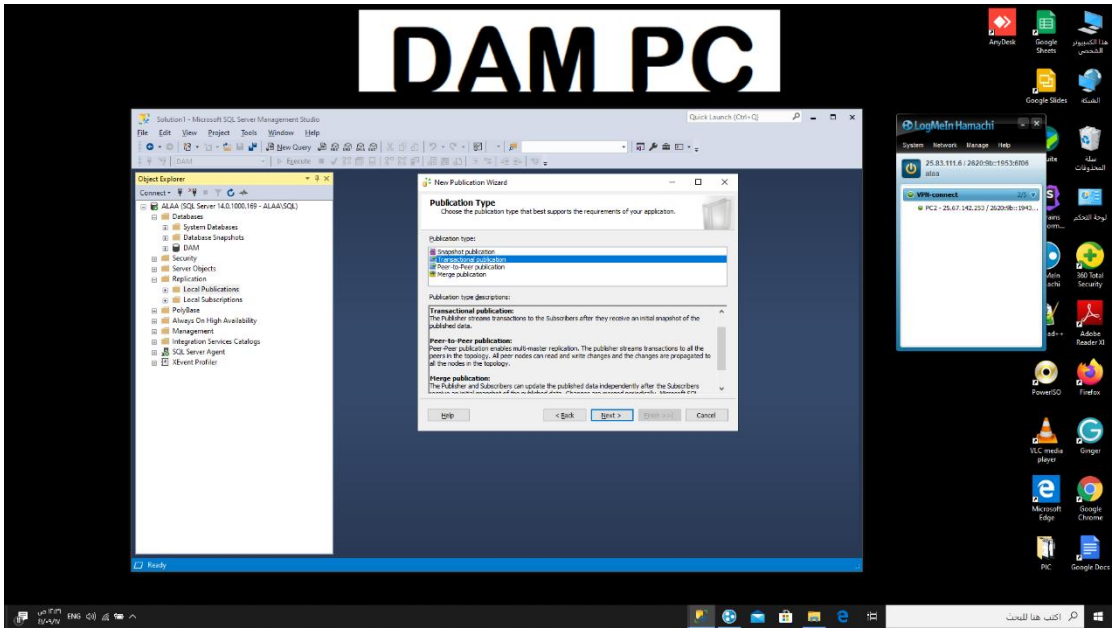
3.2.2. The New Publication Wizard appears I click next .



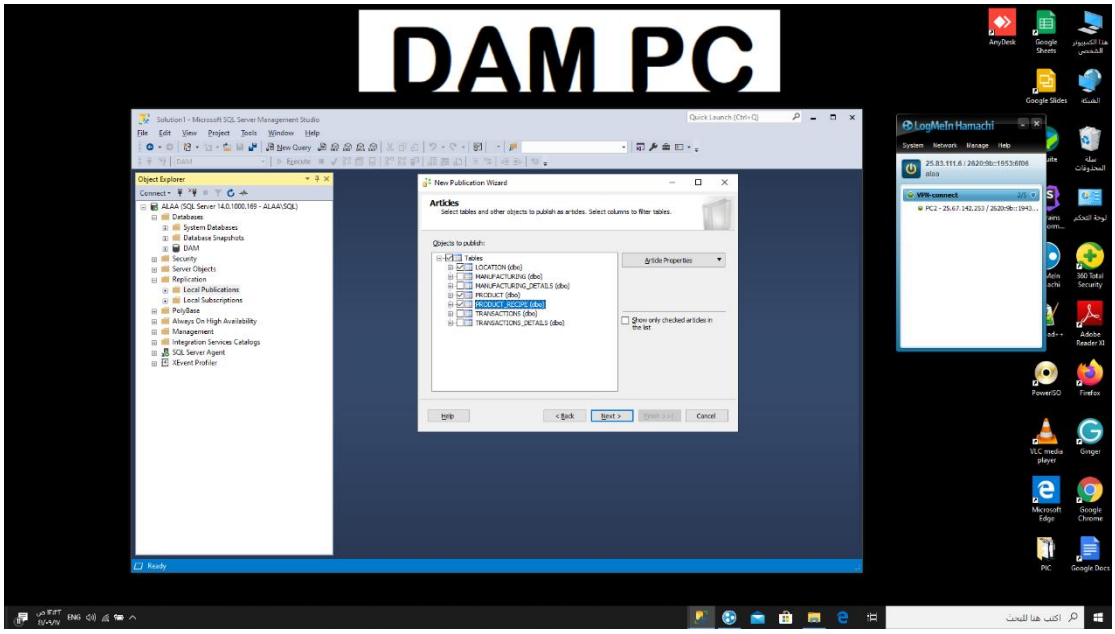
3.2.3. I choose the database which I want to synchronize.



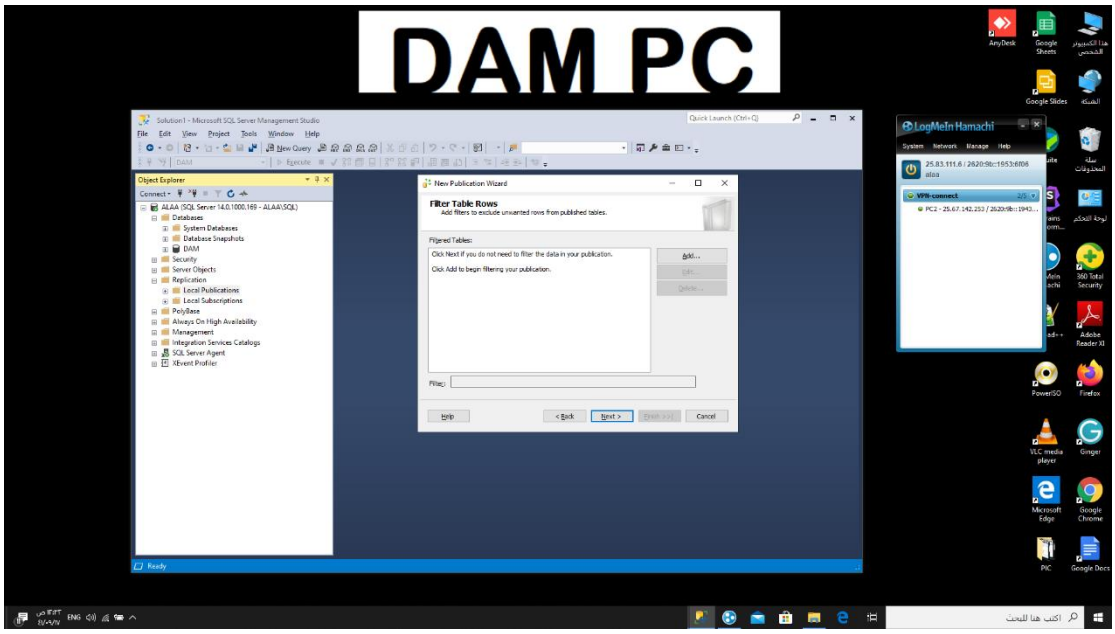
3.2.4. I choose the Transactional Replication as planned.



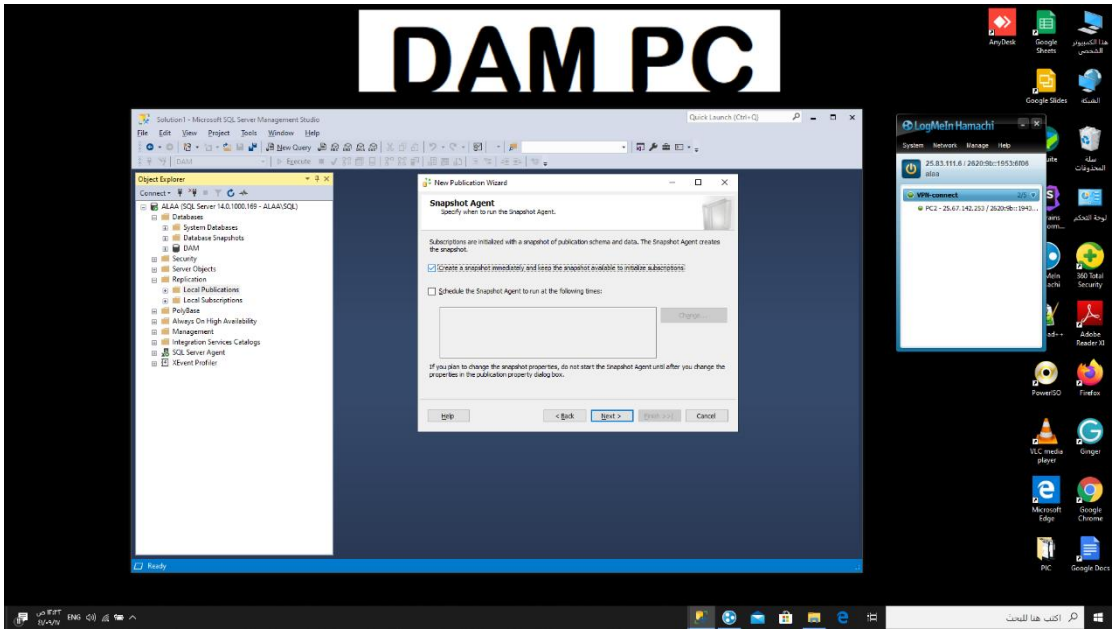
3.2.5. I choose the tables I want to sync.



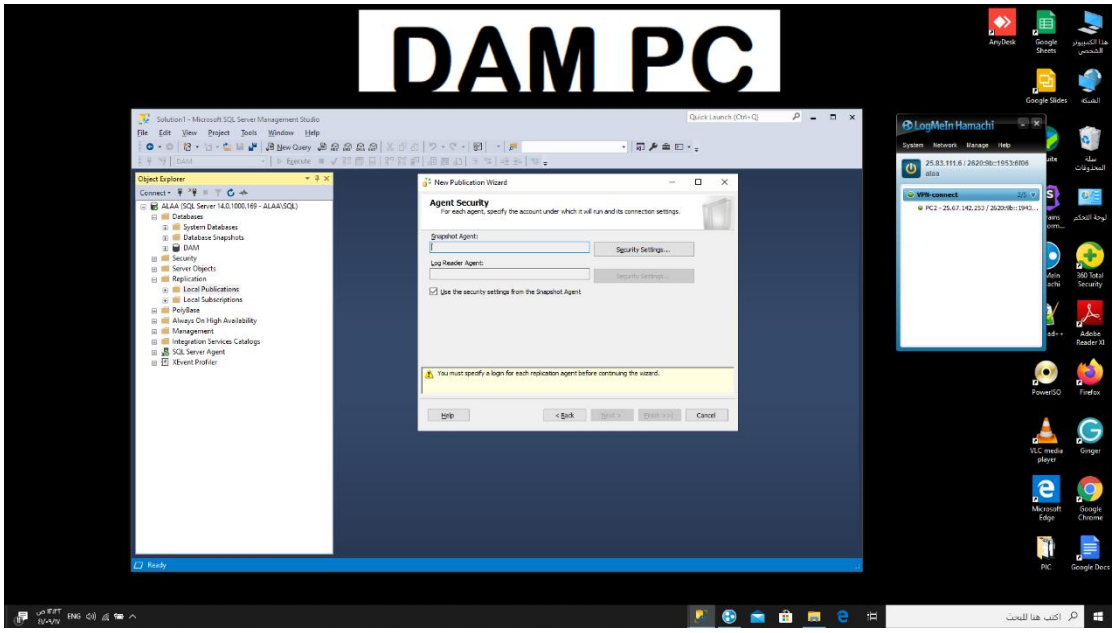
3.2.6. No specific filters are required.

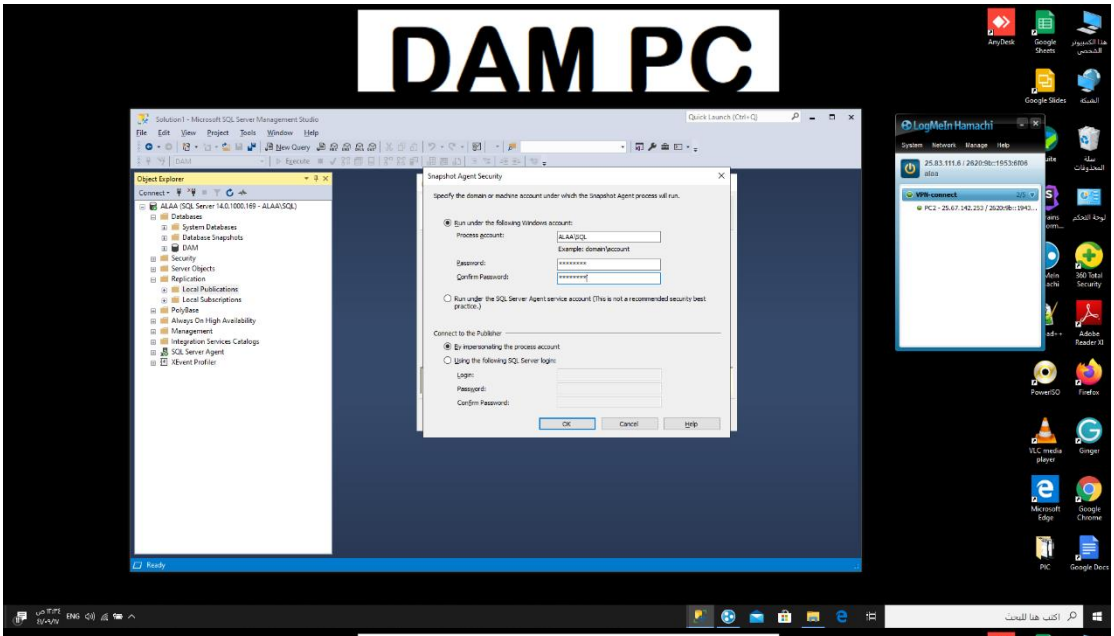


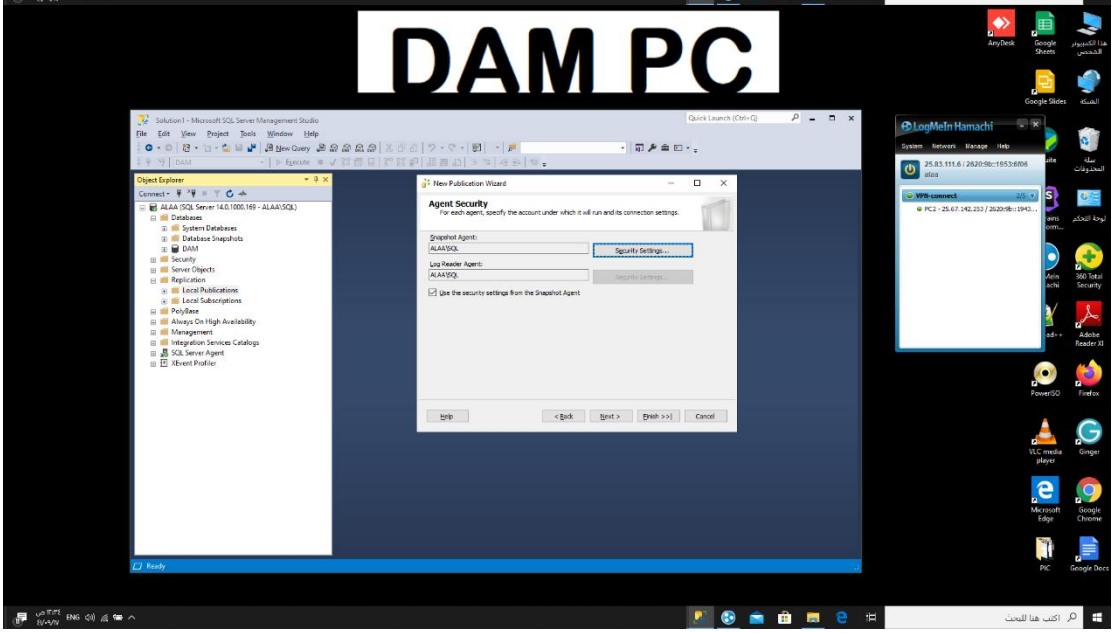
3.2.7. Create the snapshot immediately.



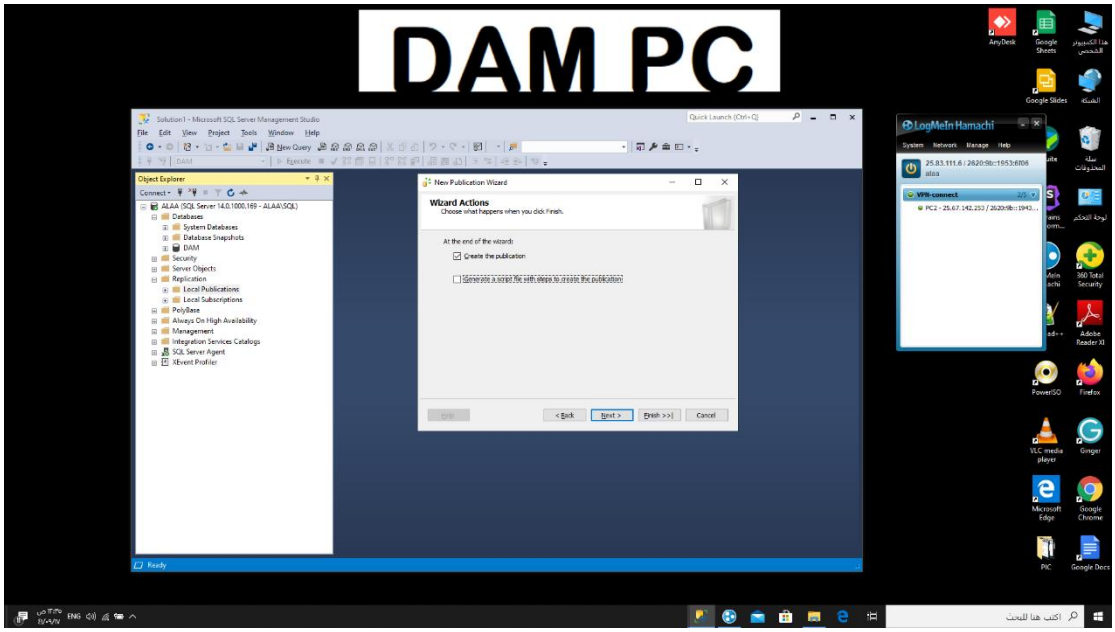
3.2.8. I enter a windows account so the Snapshot Agent process will run with.



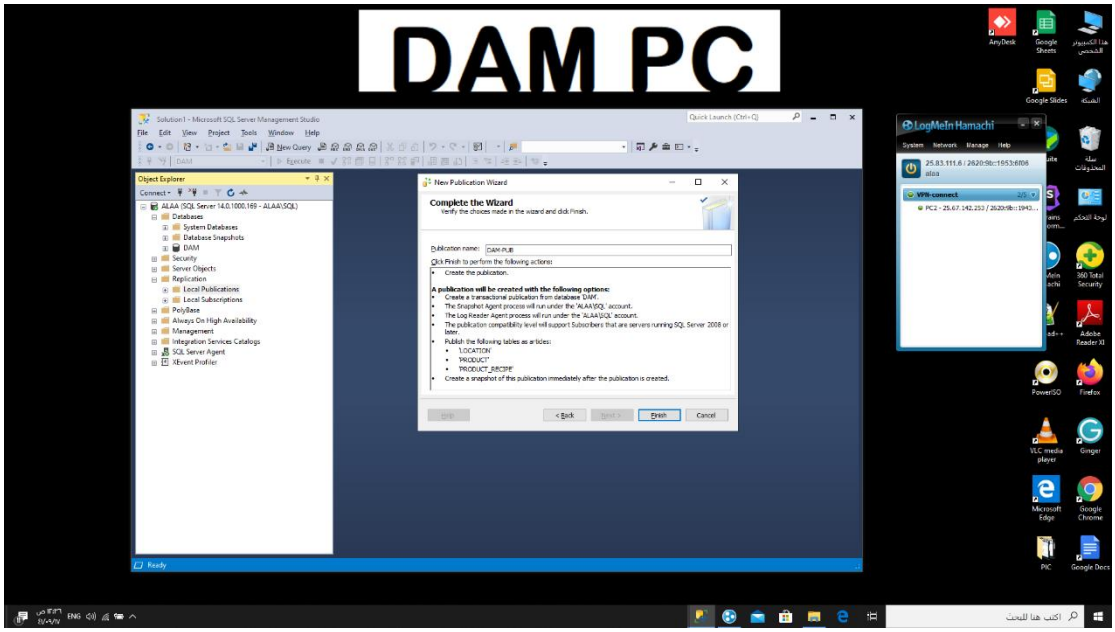

DAM PC
Snapshot Agent Security
Specify the domain or machine account under which the Snapshot Agent process will run.
Run under the following Windows account:
Process account:
ALAA\SQL
Example: domain\account
Password:
Confirm Password:
Run under the SQL Server Agent service account (This is not a recommended security best practice.)
Connect to the Publisher
By impersonating the process account
Using the following SQL Server login:
Login:
Password:
Confirm Password:
OK
Cancel
Help
Object Explorer
Connect
ALAA (SQL Server 14.0.1000.169 - ALAA\SQL)
Databases
System Databases
Database Snapshots
DAM
Security
Server Objects
Replication
Local Publications
Local Subscriptions
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
Ready
LogMeIn Hamachi
AnyDesk
Google Sheets
Google Slides
Firefox
Google Chrome
Microsoft Edge
VLC media player
Ginger
PowerISO
Adobe Reader XI
360 Total Security
Google Docs
PIC


DAM PC
New Publication Wizard
Agent Security
For each agent, specify the account under which it will run and its connection settings.
Snapshot Agent:
ALAA\SQL
Security Settings...
Log Reader Agent:
ALAA\SQL
Security Settings...
Use the security settings from the Snapshot Agent.
Help
< Back
Next >
Finish >>|
Cancel
Object Explorer
Connect
ALAA (SQL Server 14.0.1000.169 - ALAA\SQL)
Databases
System Databases
Database Snapshots
DAM
Security
Server Objects
Replication
Local Publications
Local Subscriptions
PolyBase
Always On High Availability
Management
Integration Services Catalogs
SQL Server Agent
XEvent Profiler
Ready
LogMeIn Hamachi
AnyDesk
Google Sheets
Google Slides
Firefox
Google Chrome
Microsoft Edge
VLC media player
Ginger
PowerISO
Adobe Reader XI
360 Total Security
Google Docs
PIC

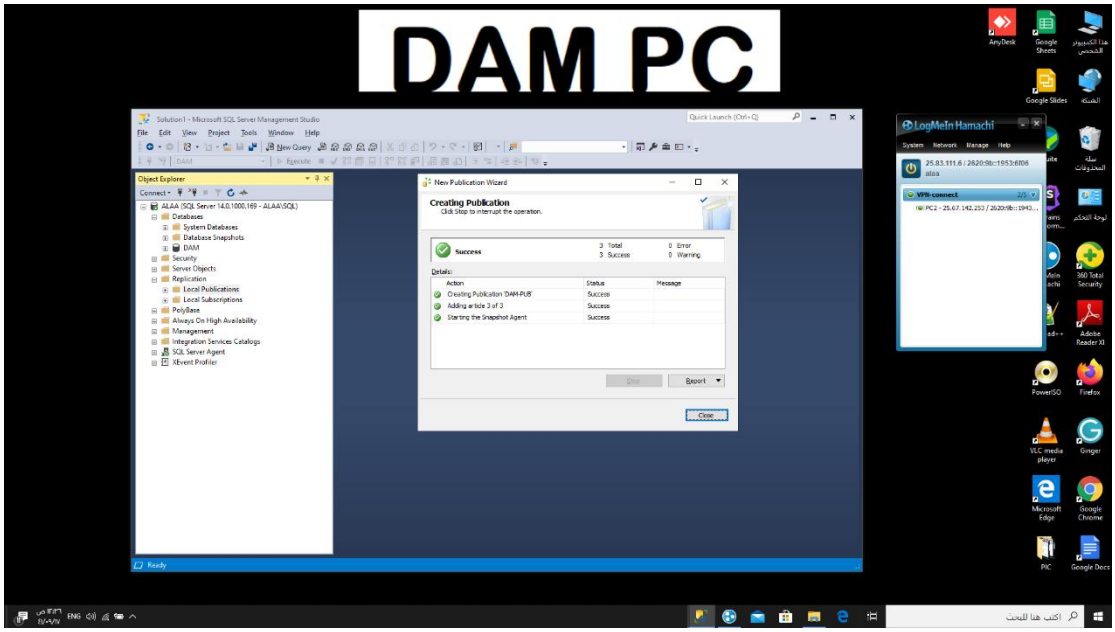
3.2.9. I check create the Publication.



3.2.10. I name it DAM_PUB.



3.2.11. After clicking finish the wizard start the whole operation and shows a successful result.

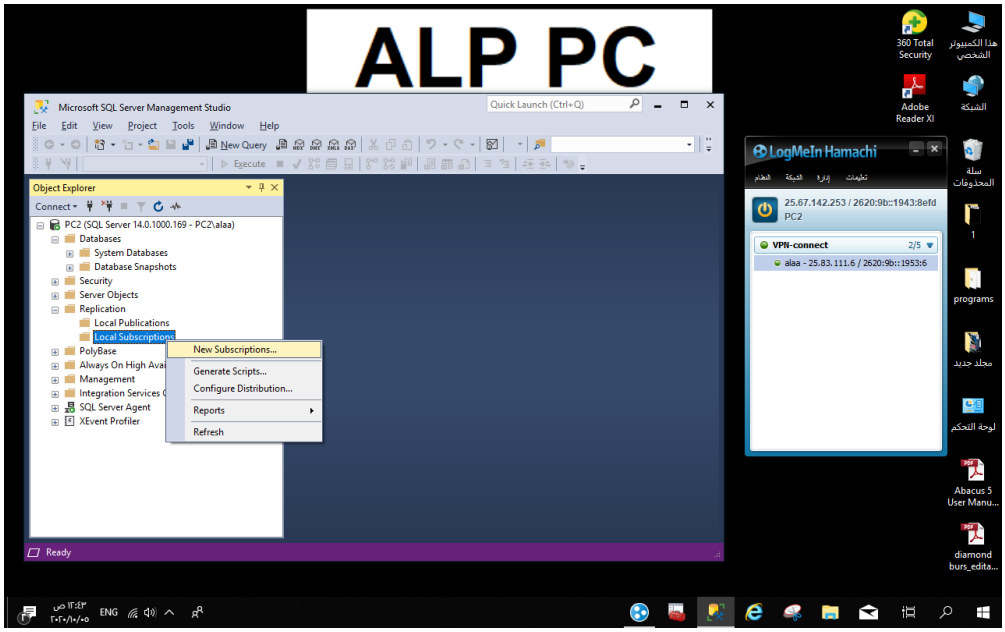


3.3. Create a SQL replication subscriber

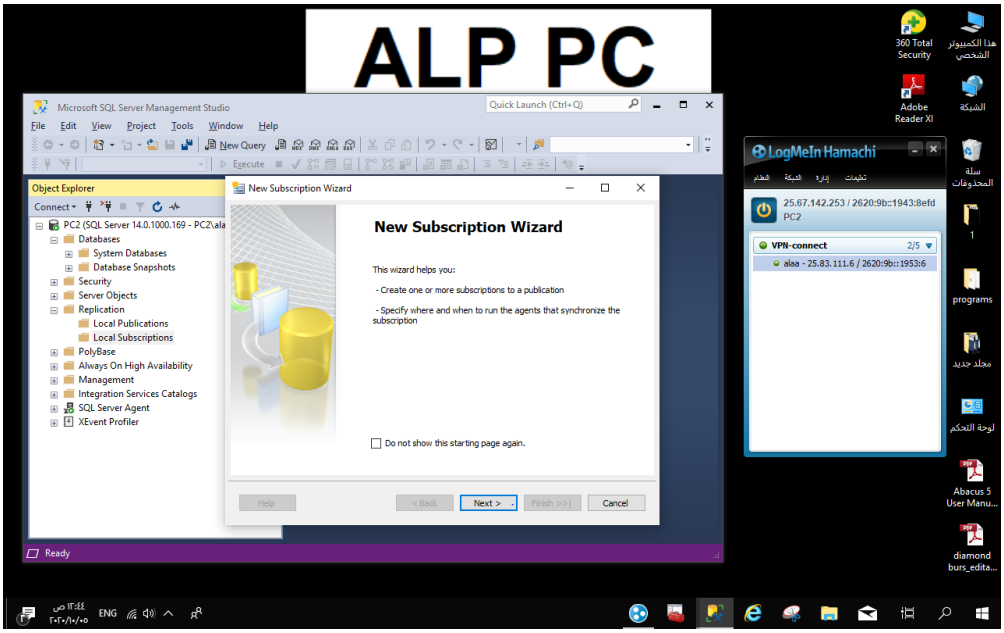
In the second laptop on another server [PC2] (ALEPPO BRANCH)

Windows account [PC2\alaa]

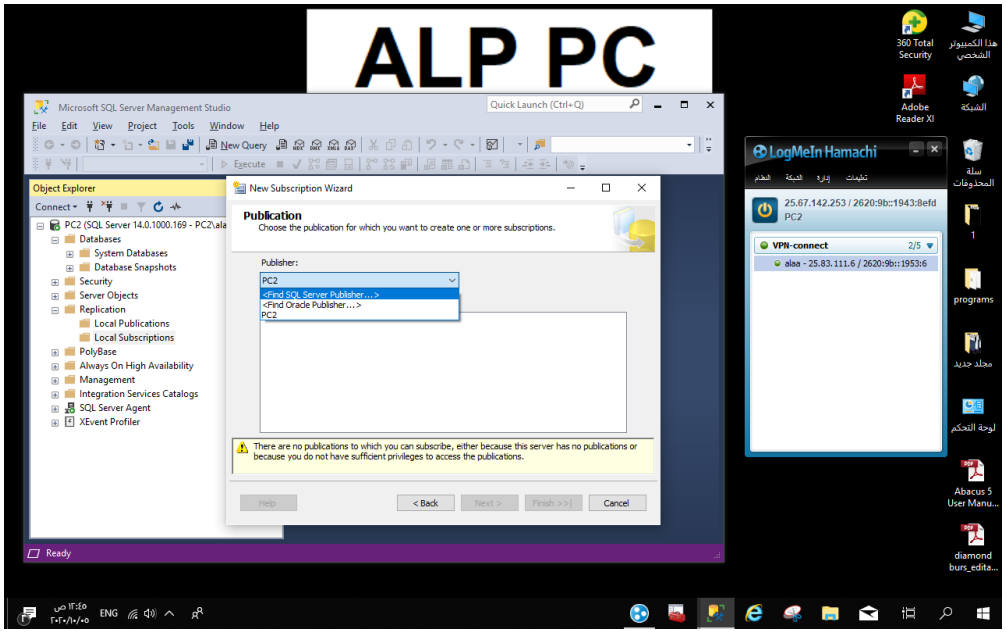
3.3.1 Create a new subscription.

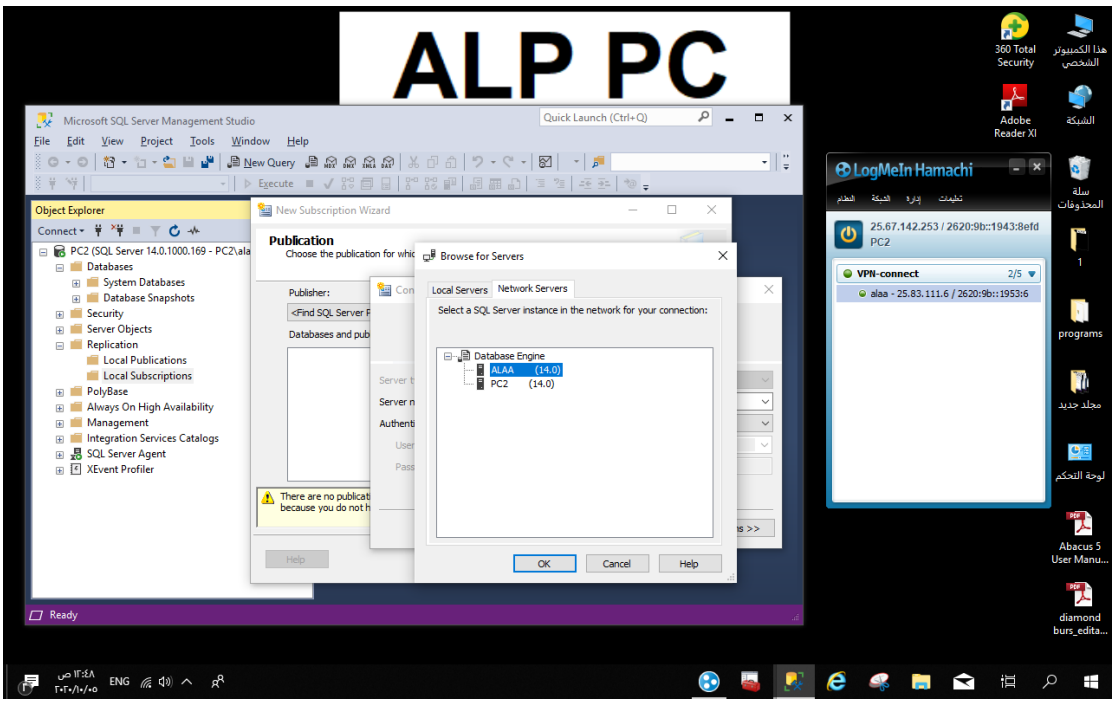


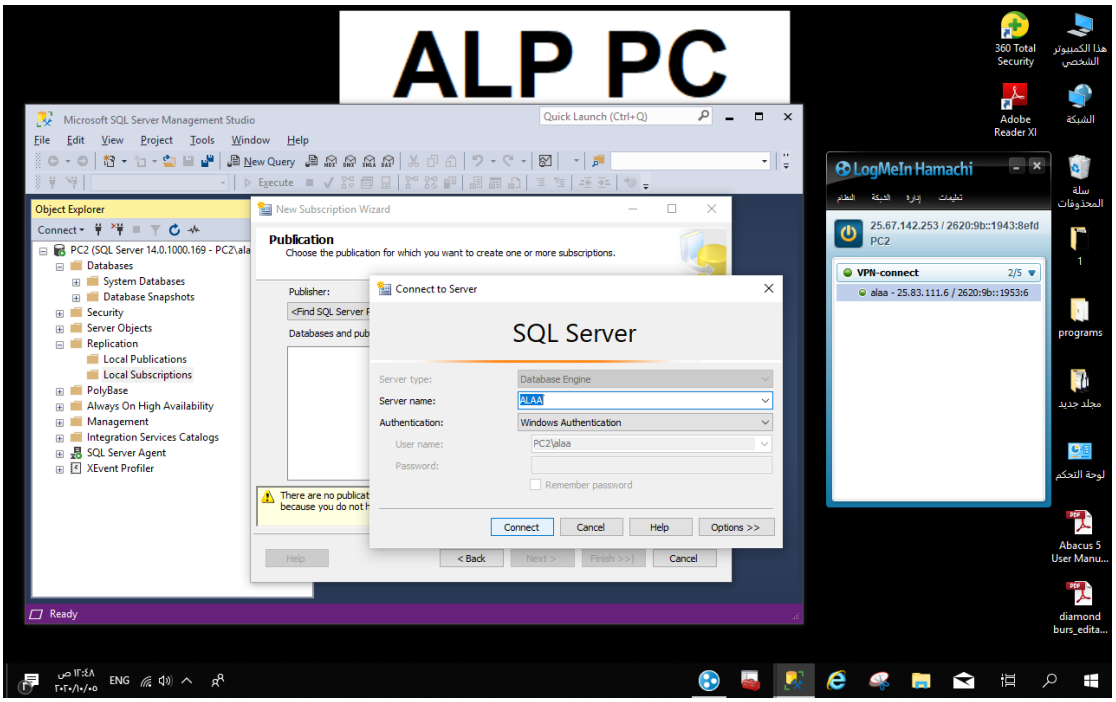
3.3.2 The wizard appears I click next.

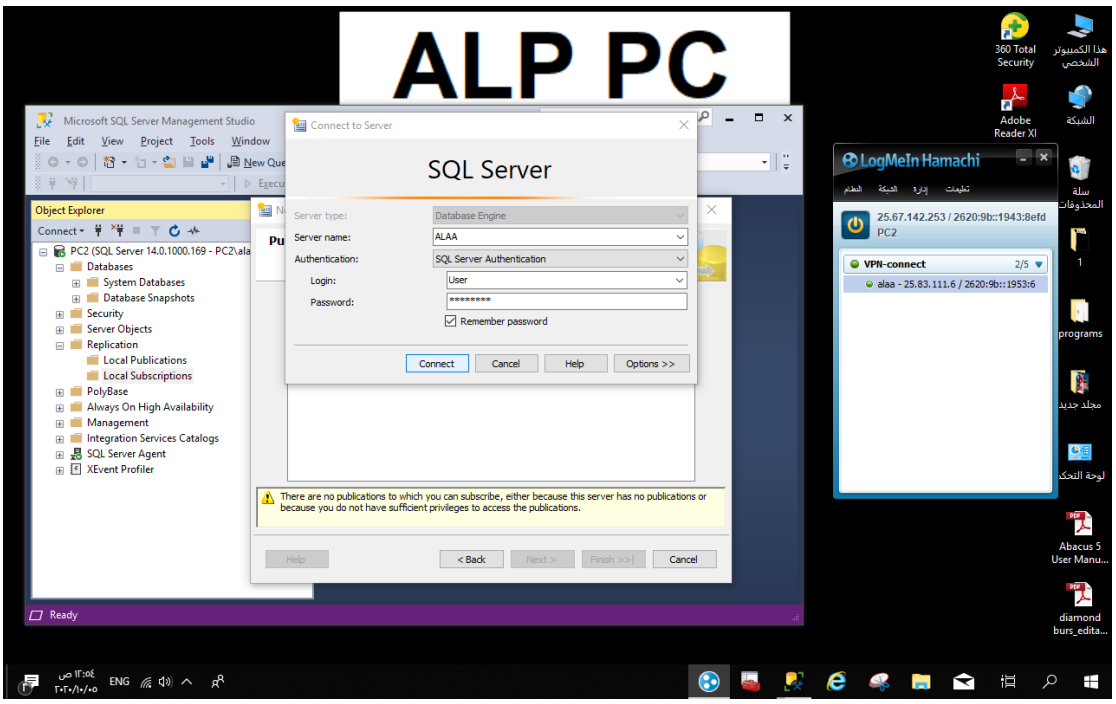


3.3.3 I choose the publisher server.

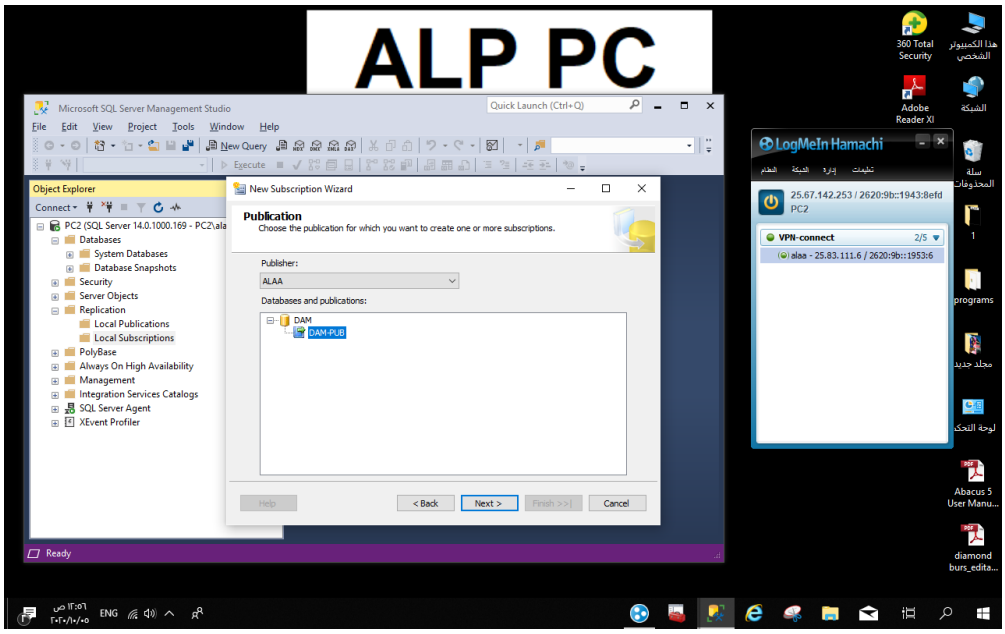



ALP PC
Microsoft SQL Server Management Studio
Object Explorer
New Subscription Wizard
Publication
Browse for Servers
Local Servers
Network Servers
Select a SQL Server instance in the network for your connection:
Database Engine
ALAA (14.0)
PC2 (14.0)
OK
Cancel
Help
Ready
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
alaa - 25.83.111.6 / 2620:9b::1953:6

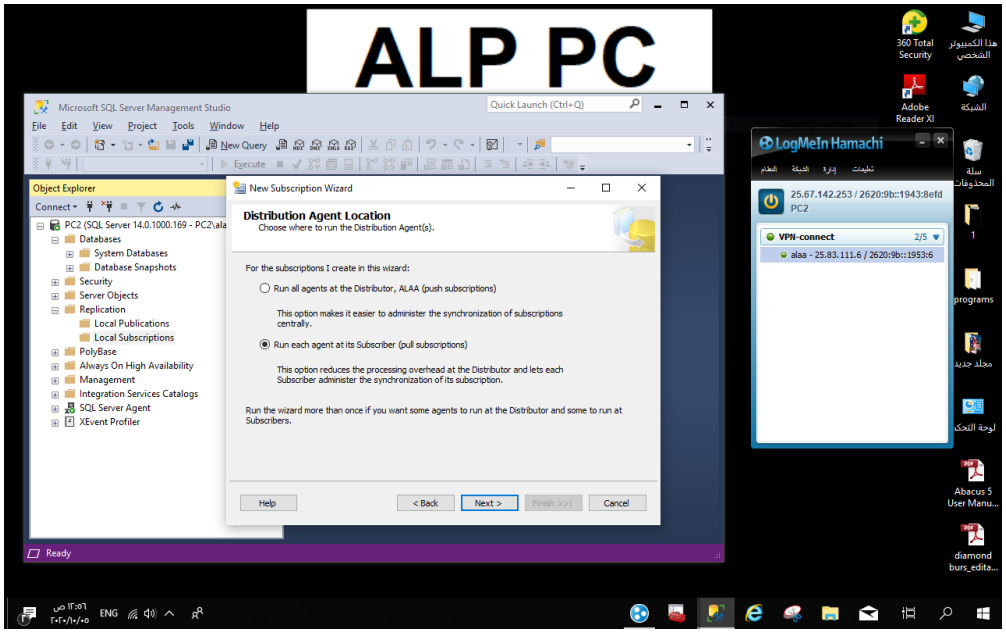

ALP PC
Microsoft SQL Server Management Studio
Object Explorer
New Subscription Wizard
Publication
Choose the publication for which you want to create one or more subscriptions.
Connect to Server
SQL Server
Server type:
Database Engine
Server name:
ALAA
Authentication:
Windows Authentication
User name:
PC2\alaa
Password:
Remember password
Connect
Cancel
Help
Options >>
Ready
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
alaa - 25.83.111.6 / 2620:9b::1953:6



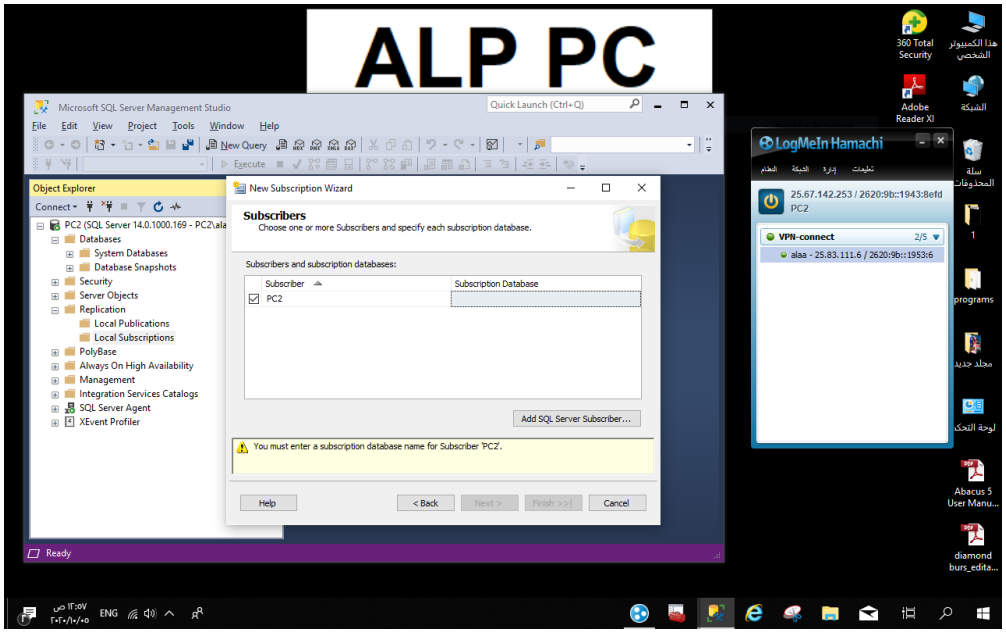
3.3.4 I choose the Publication which I created.

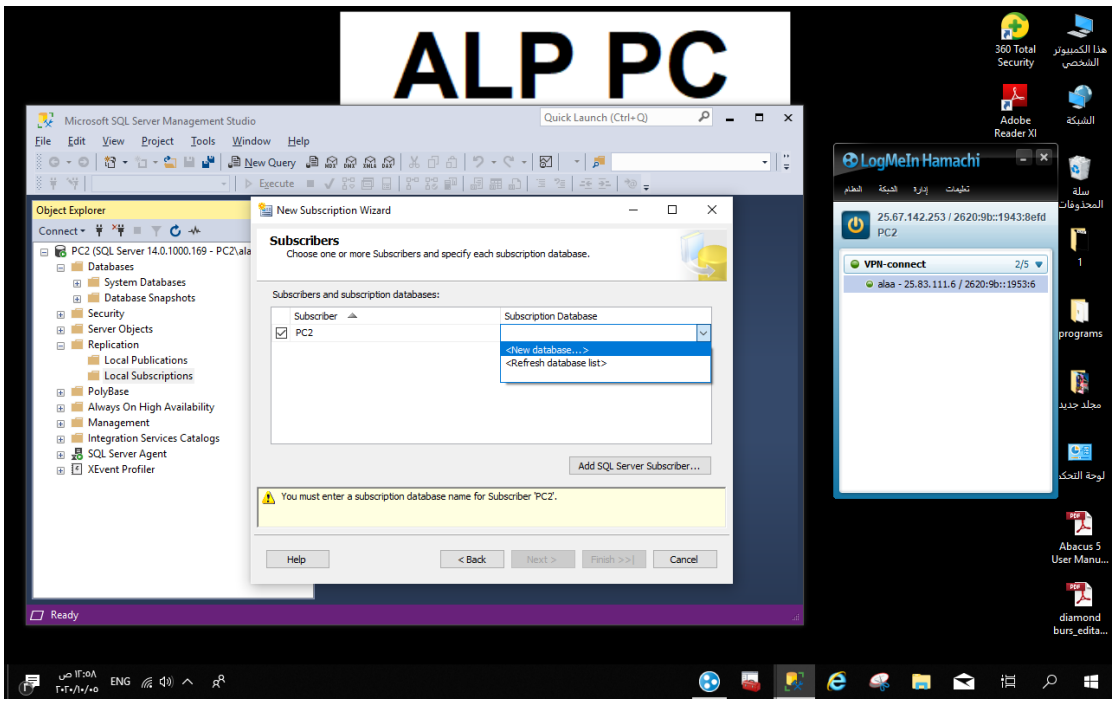


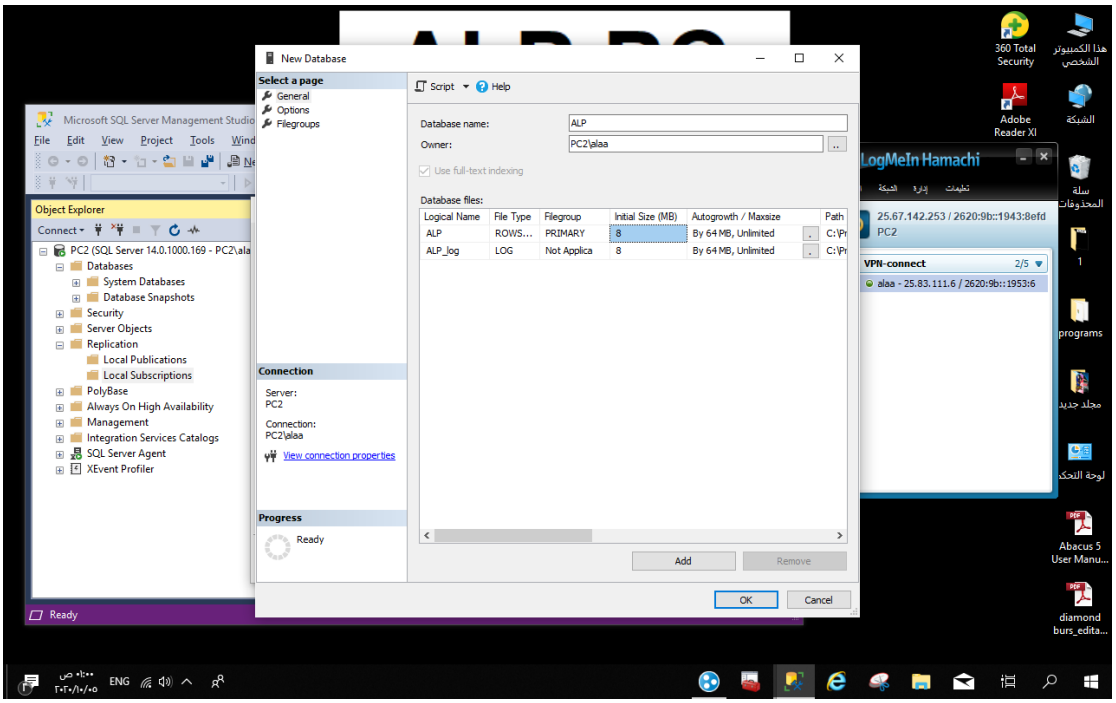
3.3.5 I choose the pull subscription

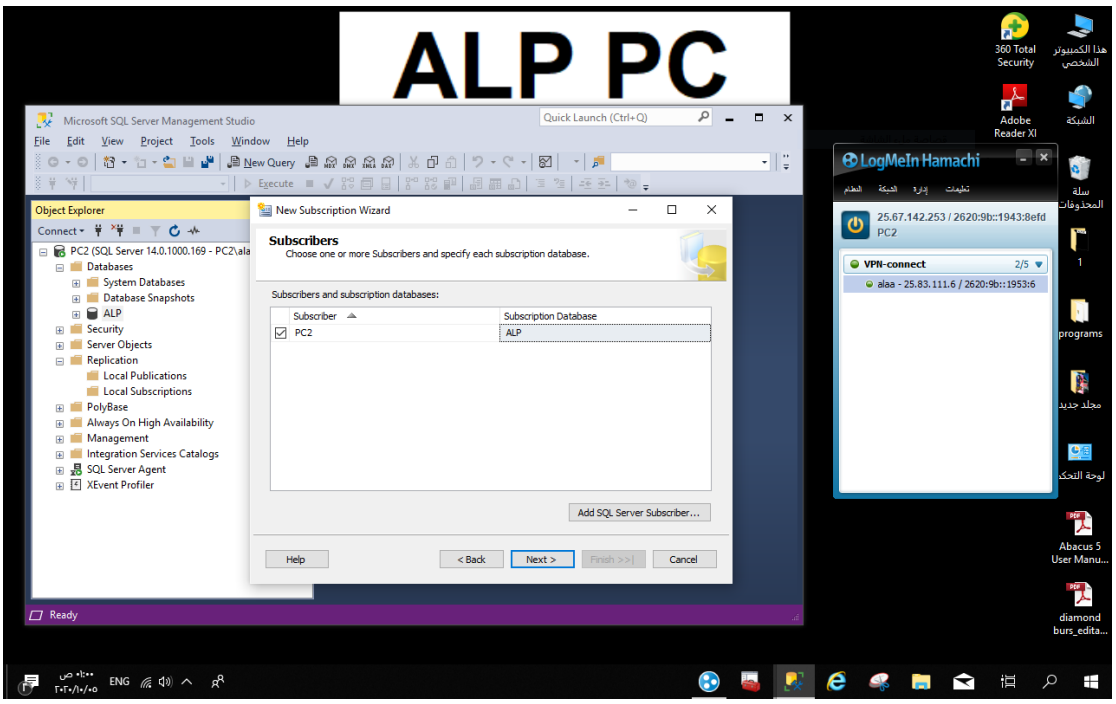


3.3.6 I will create a new database and name it (ALP) which I want it to receive the synchronization.

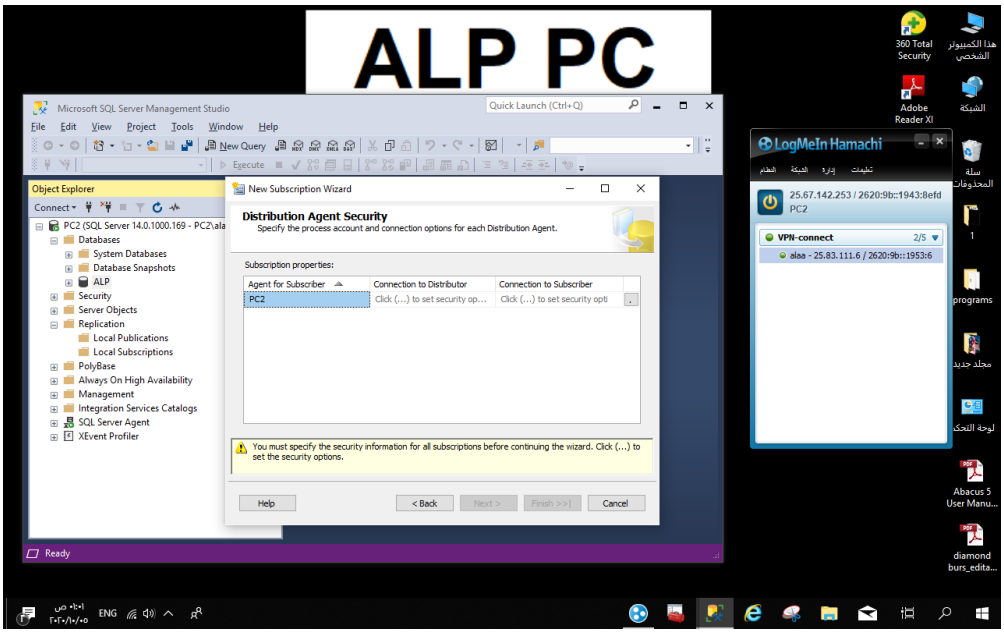



ALP PC
Microsoft SQL Server Management Studio
New Subscription Wizard
Subscribers
Choose one or more Subscribers and specify each subscription database.
Subscribers and subscription databases:
Subscriber
Subscription Database
PC2
<New database...>
<Refresh database list>
Add SQL Server Subscriber...
You must enter a subscription database name for Subscriber 'PC2'.
Help
< Back
Next >
Finish >>|
Cancel
Object Explorer
Ready
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
alaa - 25.83.111.6 / 2620:9b::1953:6

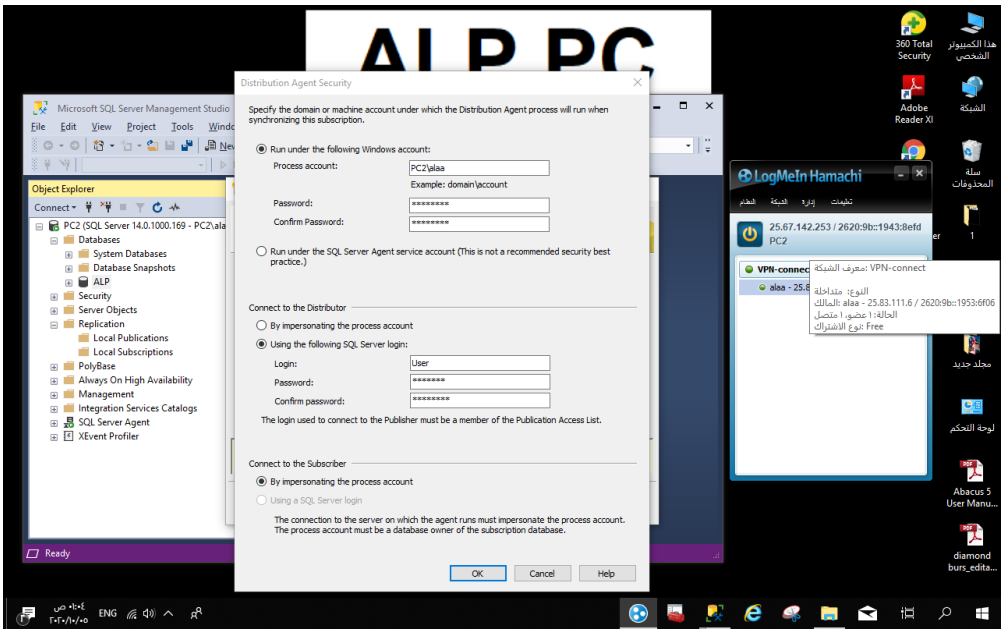

New Database
Select a page
General
Options
Filegroups
Script
Help
Database name:
ALP
Owner:
PC2\alaa
Use full-text indexing
Database files:
Logical Name
File Type
Filegroup
Initial Size (MB)
Autogrowth / Maxsize
Path
ALP
ROWS...
PRIMARY
8
By 64 MB, Unlimited
ALP_log
LOG
Not Applica
8
By 64 MB, Unlimited
Connection
Server:
PC2
Connection:
PC2\alaa
View connection properties
Progress
Ready
Add
Remove
OK
Cancel
Object Explorer
Ready
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
alaa - 25.83.111.6 / 2620:9b::1953:6

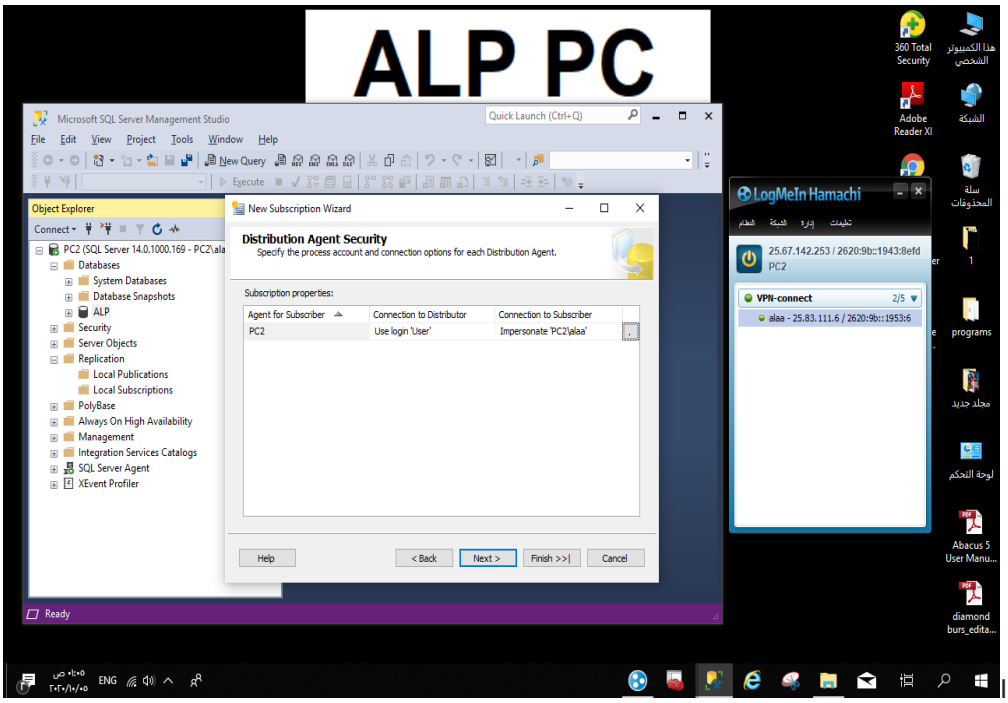


3.3.7 I choose the security method.

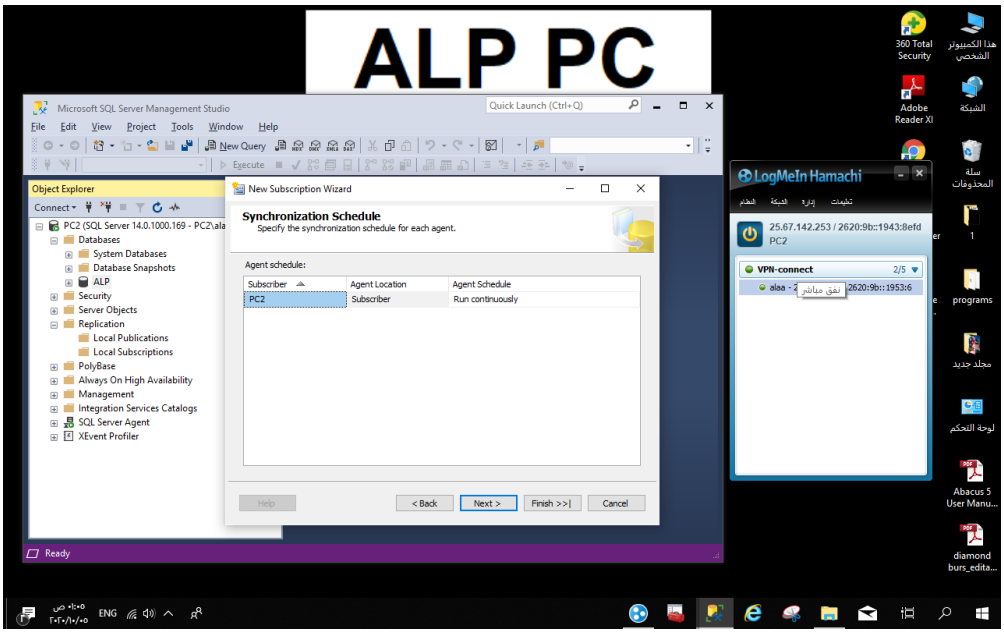


3.3.8 I enter a windows user for Distribution Agent process to run with.

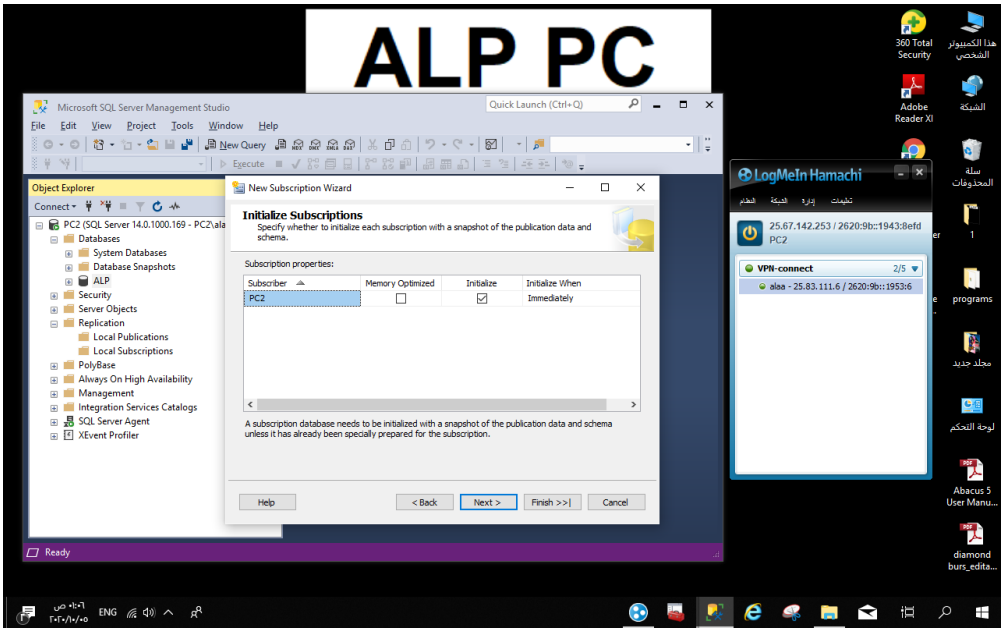




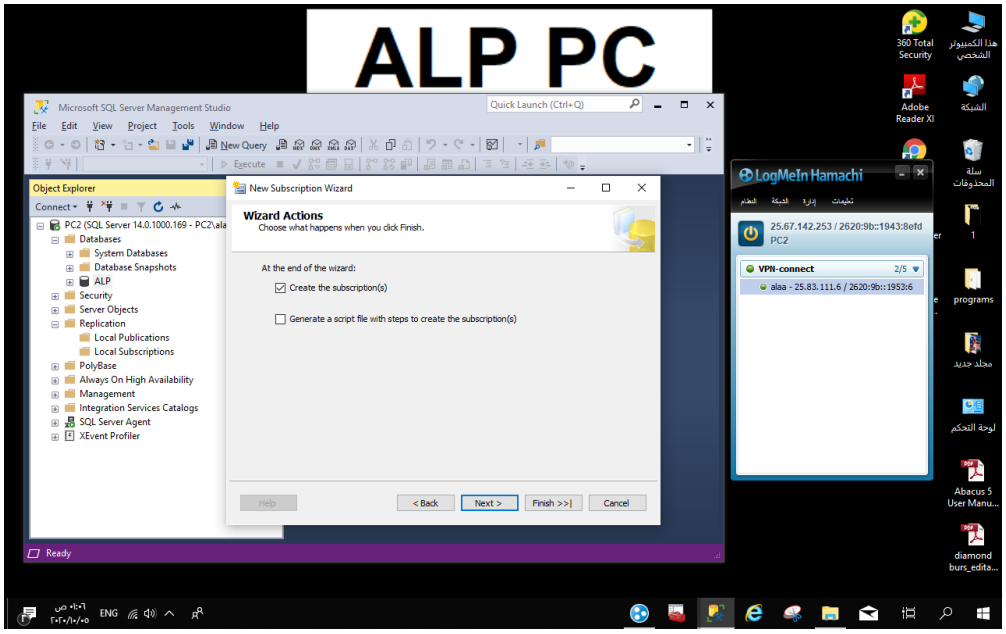
3.3.9 set the Synchronization schedule to run continuously.



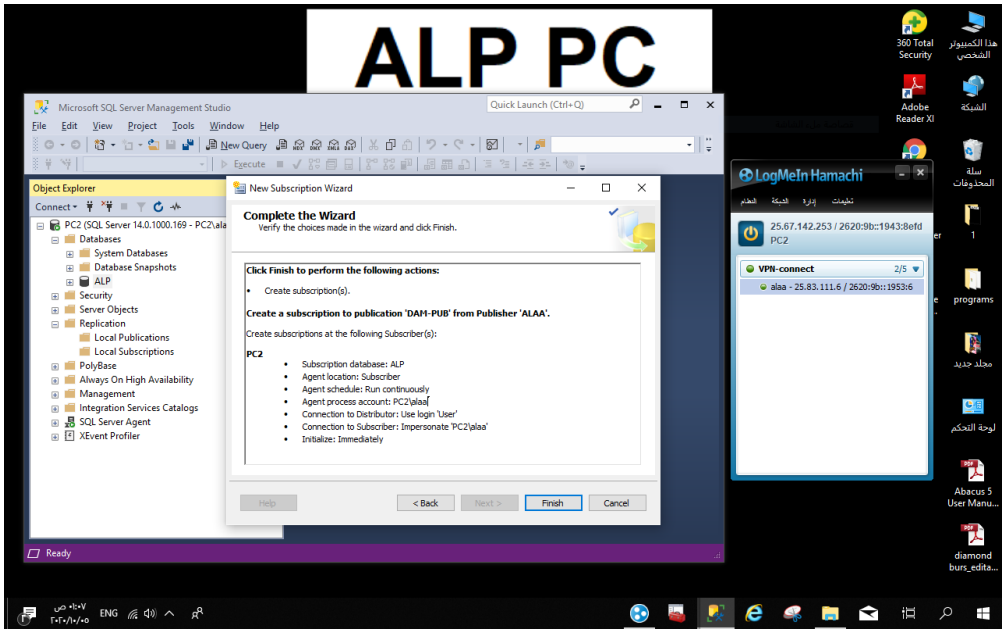
3.3.10 I initialize the Subscription immediately.

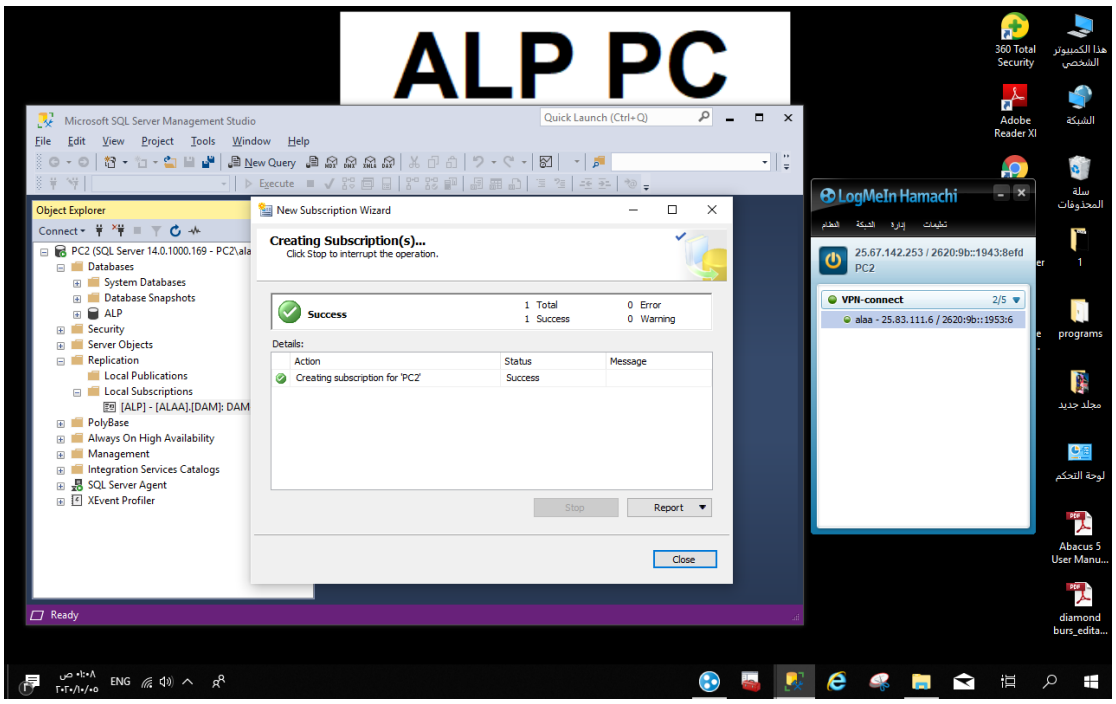


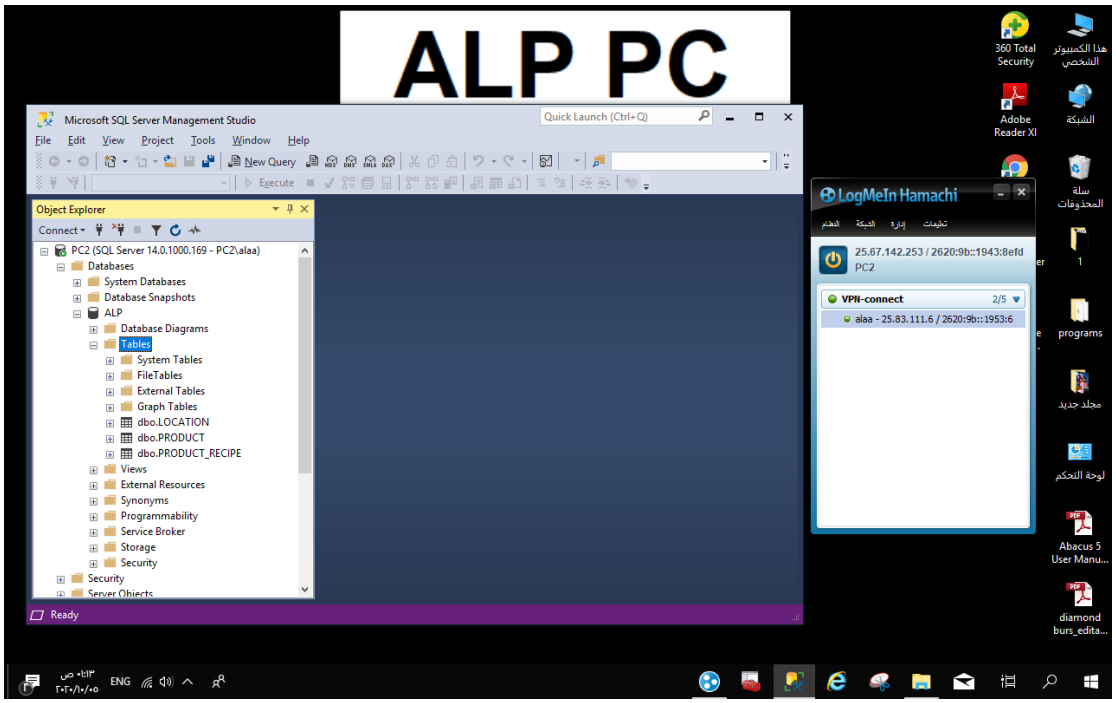
3.3.11 I check create the Subscription.



3.3.12 The wizard will do the operation and shows a successful result







Now You can see synchronize the Location, product, product_recipe from (DAM) down to the (ALP).

4. Bidirectional [Over internet]

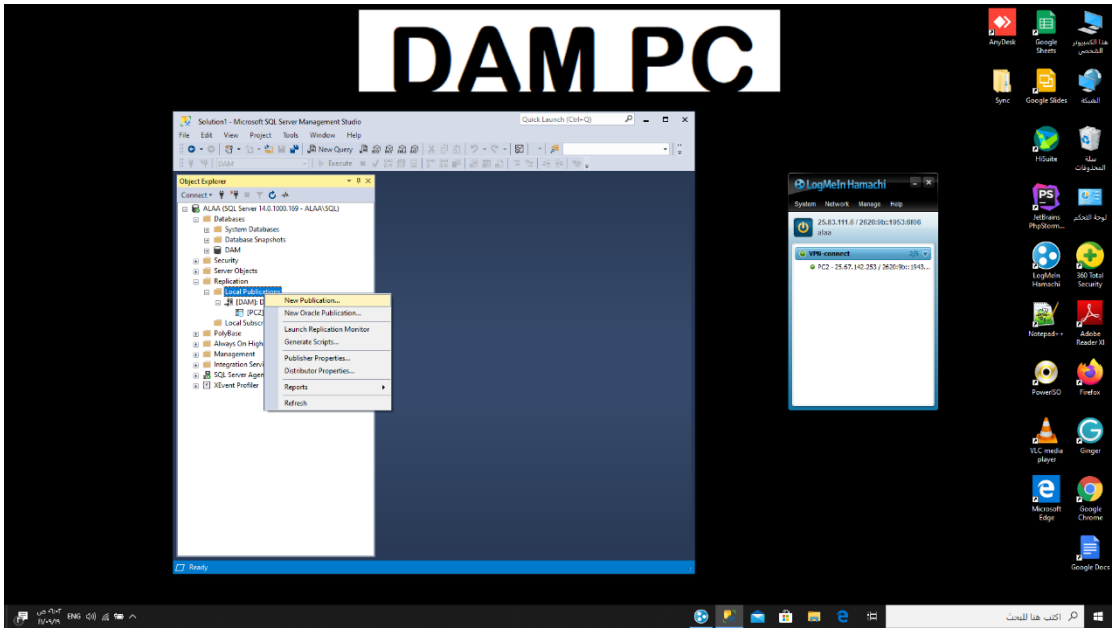
at every moment the tables of Transactions and manufacturing should match in DAM & ALP **(bidirectional)**.

4.1. Create a SQL replication publisher

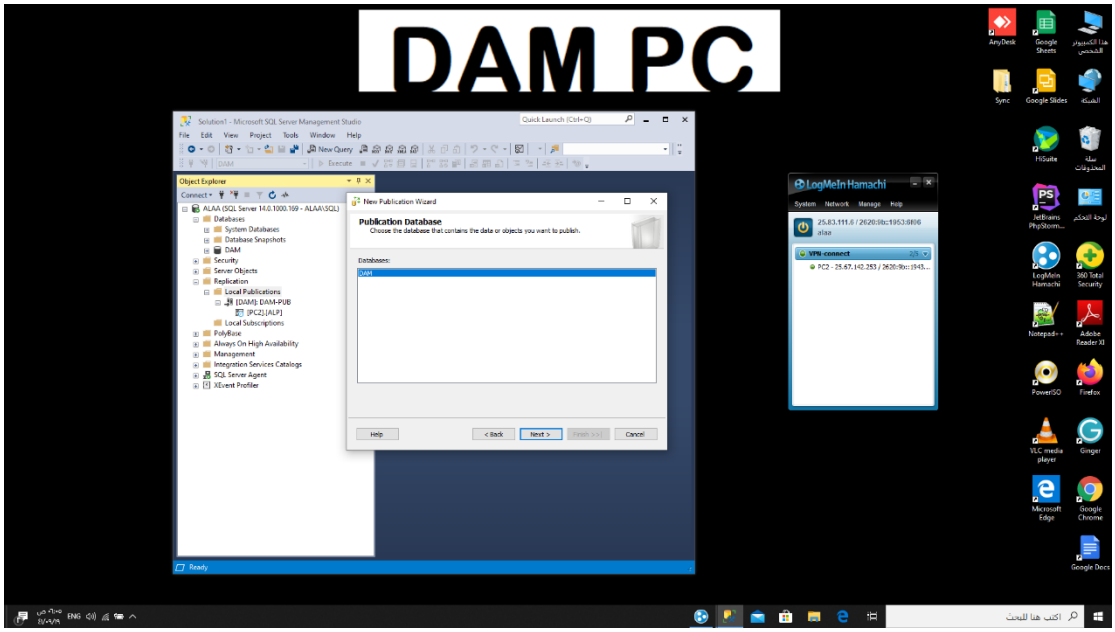
In the first laptop on server [ALAA] (HO DAMASCUS)

Windows account [ALAA\SQL]

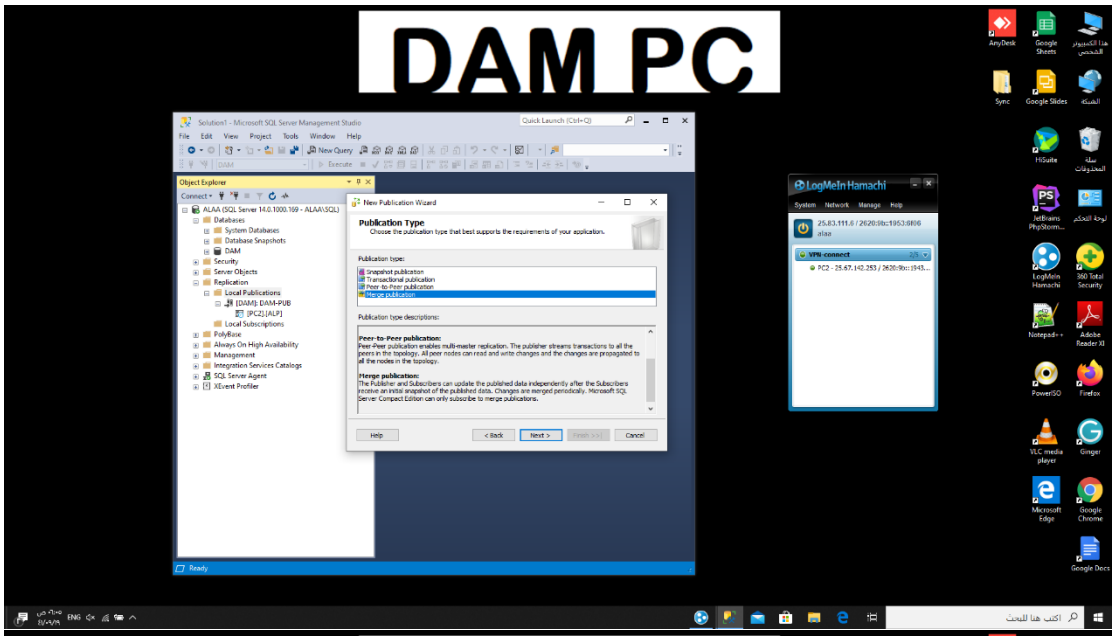
4.1.1. On the HO instance (DAM), create a new Publication .

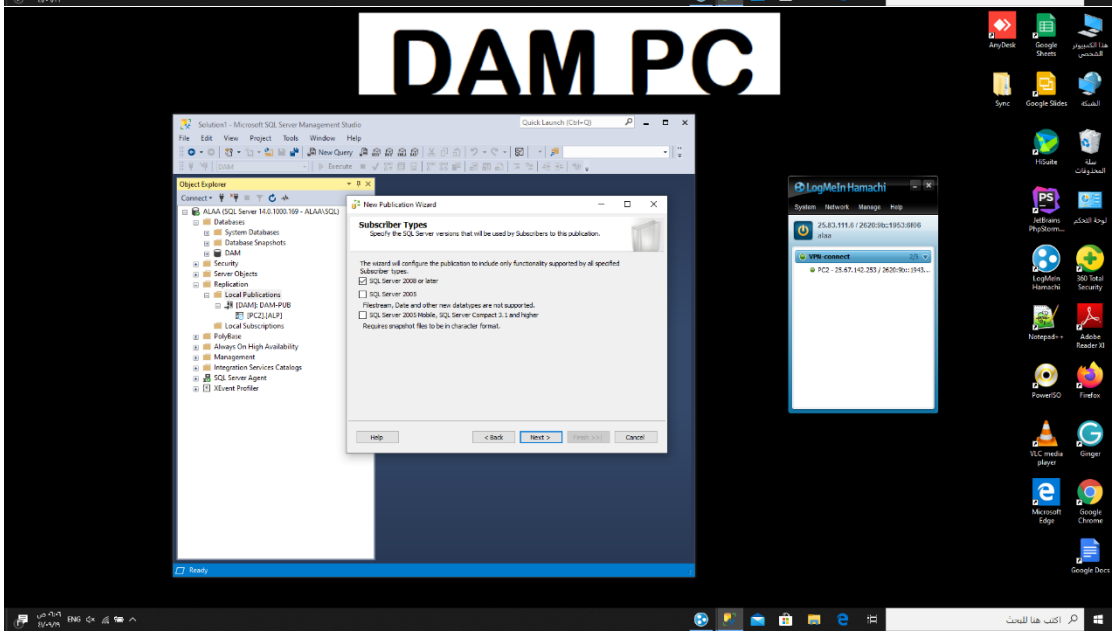


4.1.2. I choose the database which I want to synchronize.

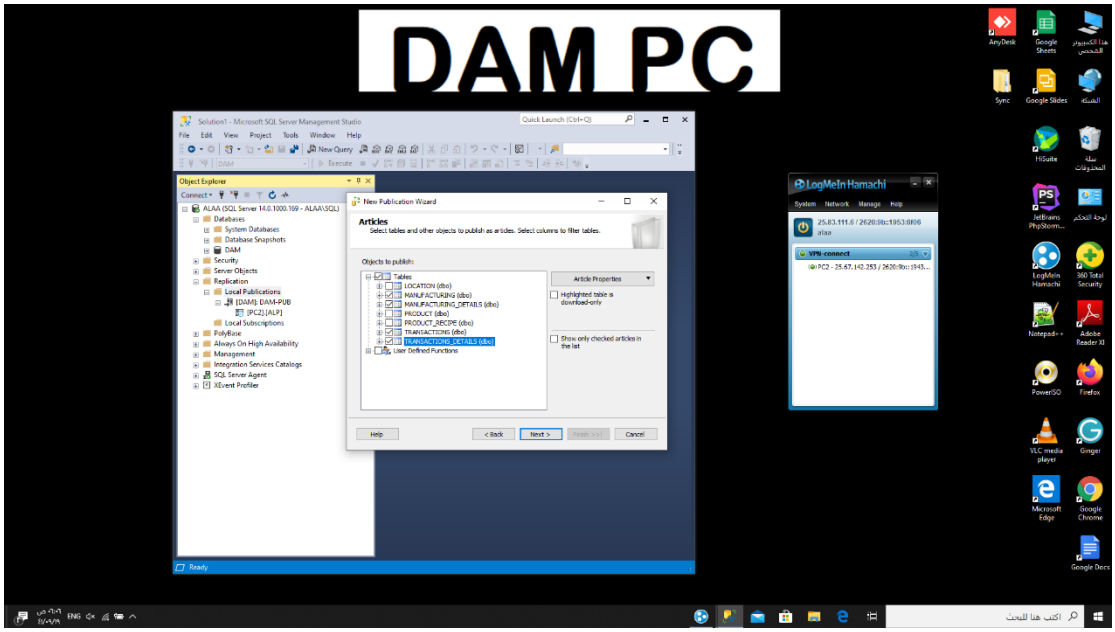


4.1.3. I choose the Merge Replication as planned.

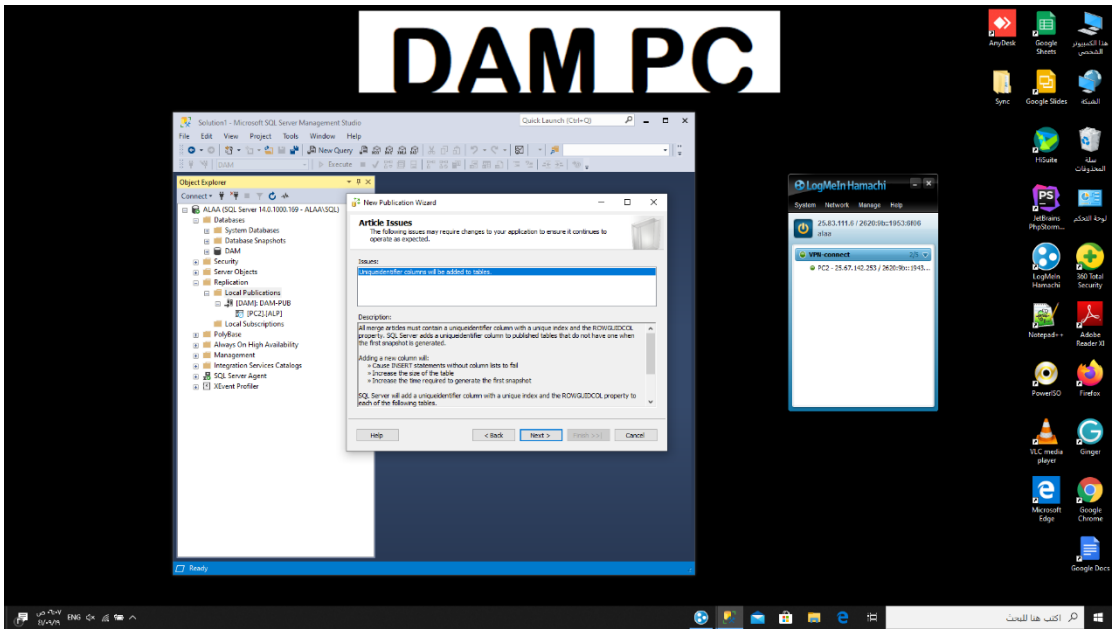




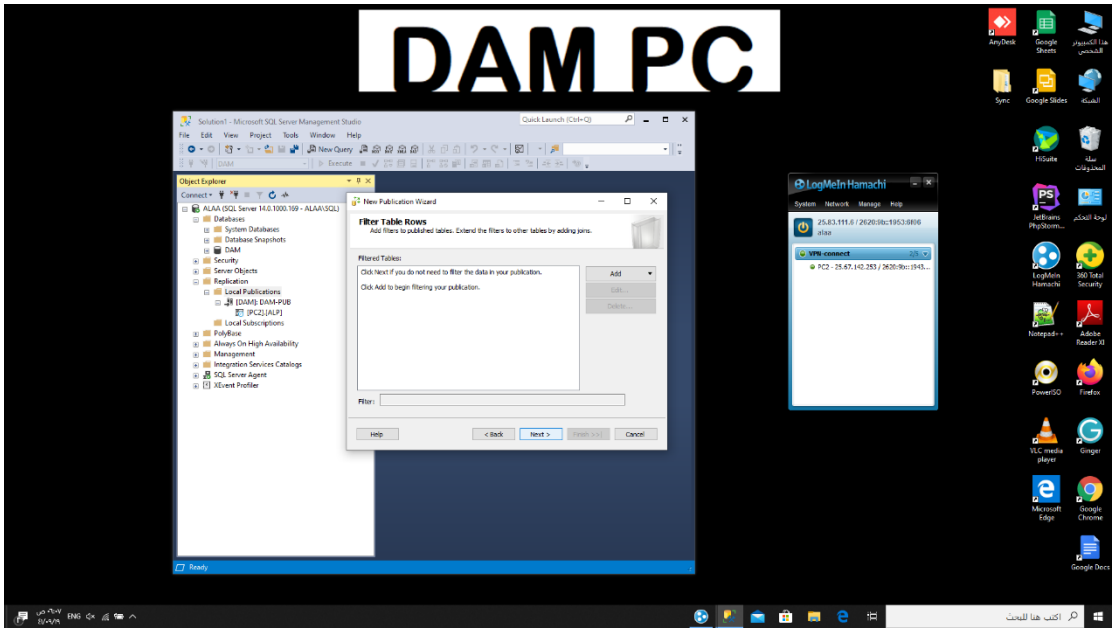
4.1.4. I choose the tables I want to sync.



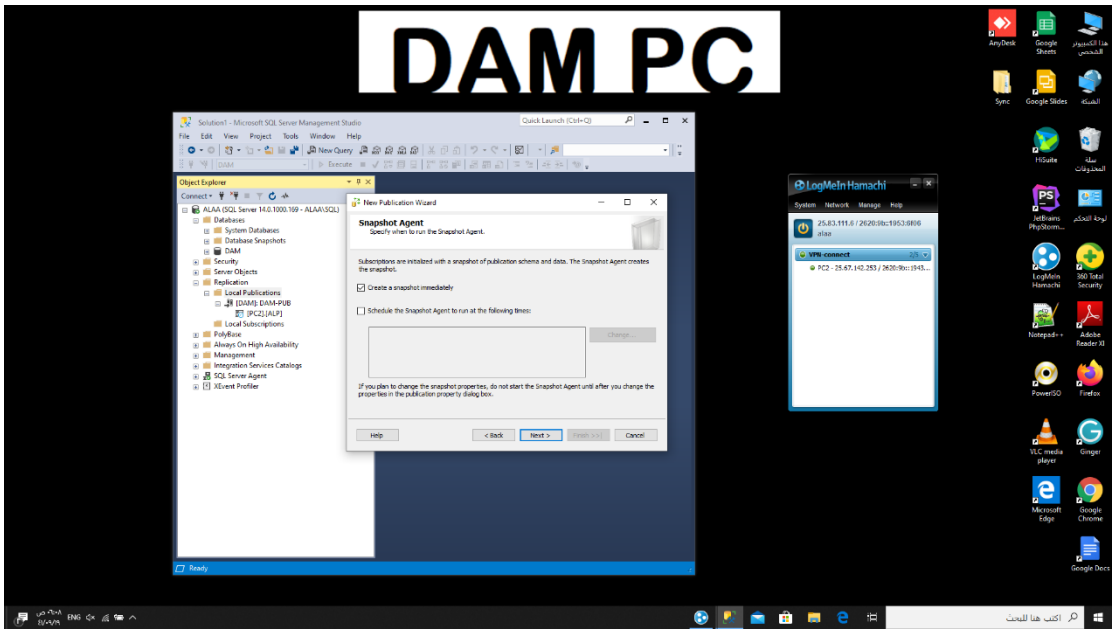
4.1.5. Uniqueidentifier column will be added to table (GUID)



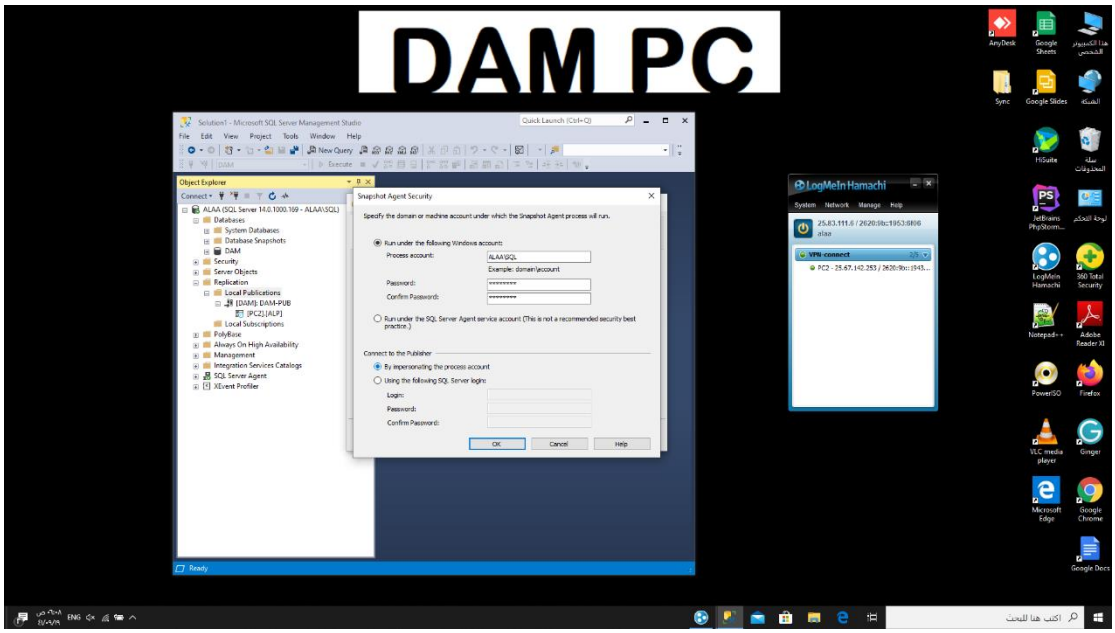
4.1.6. No specific filters are required.



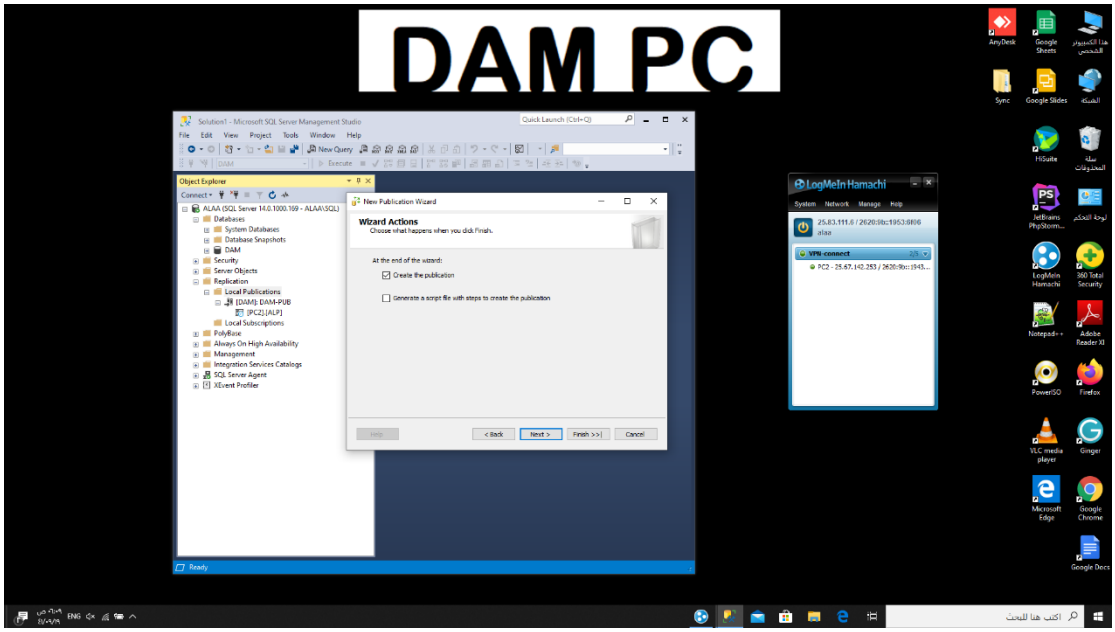
4.1.7. Create the snapshot immediately.



4.1.8. I enter a windows account so the Snapshot Agent process will run with.

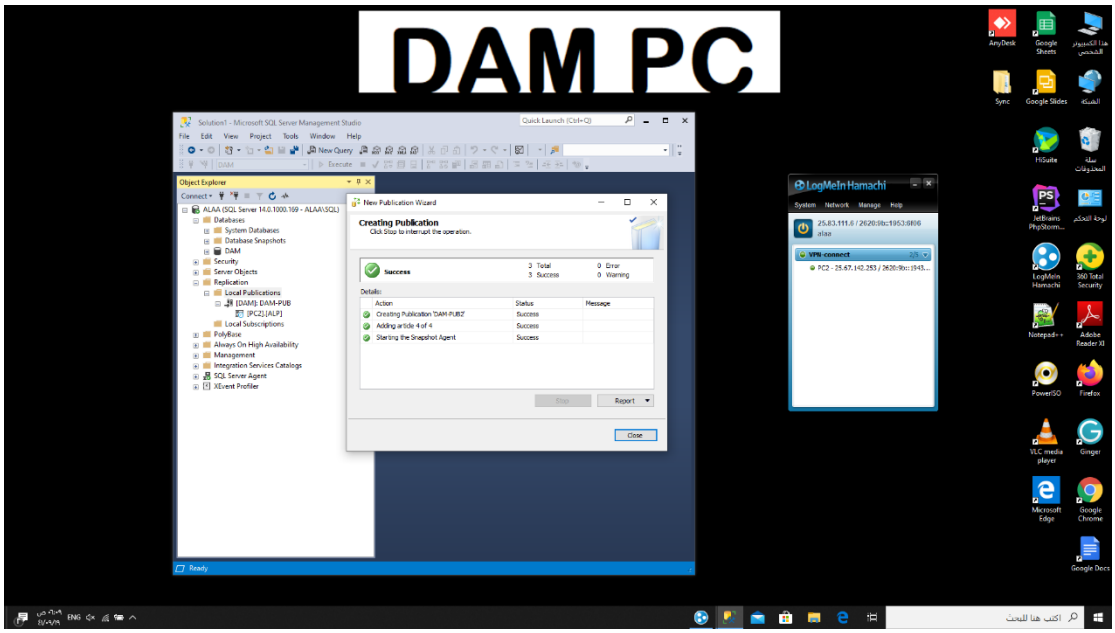


4.1.9. I check create the Publication.

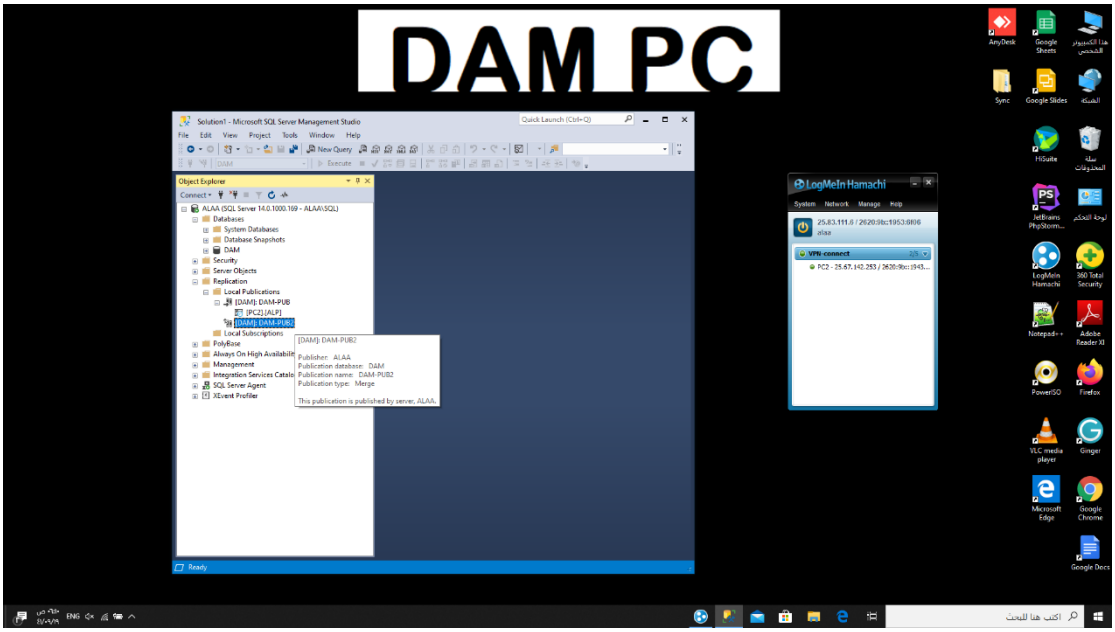


I name it DAM_PUB2.

4.1.10 After clicking finish the wizard start the whole operation and shows a successful result.



4.1.11 DAM_PUB2

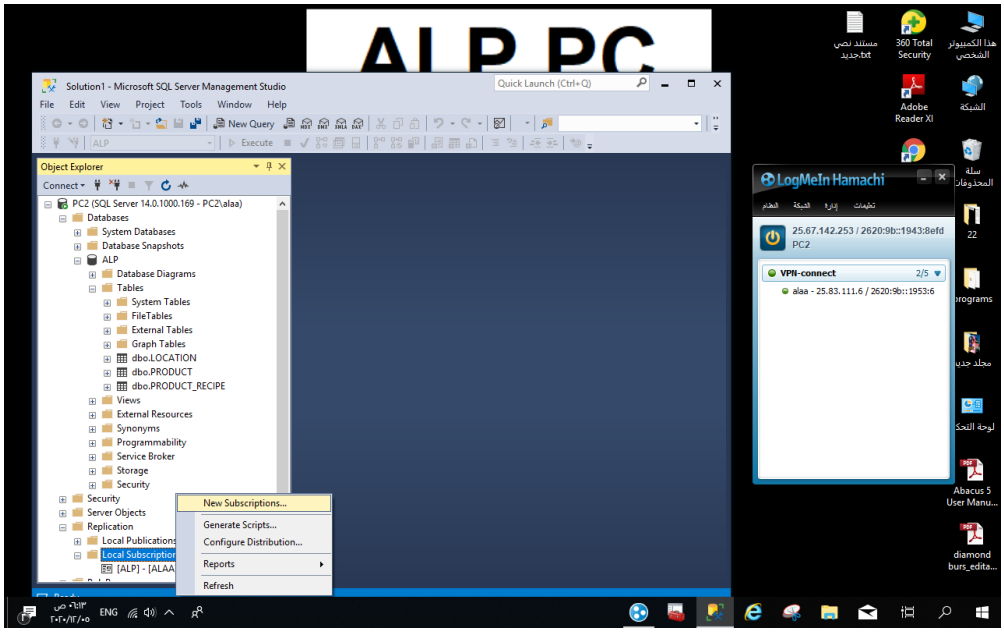


4.2. Create a SQL replication subscriber

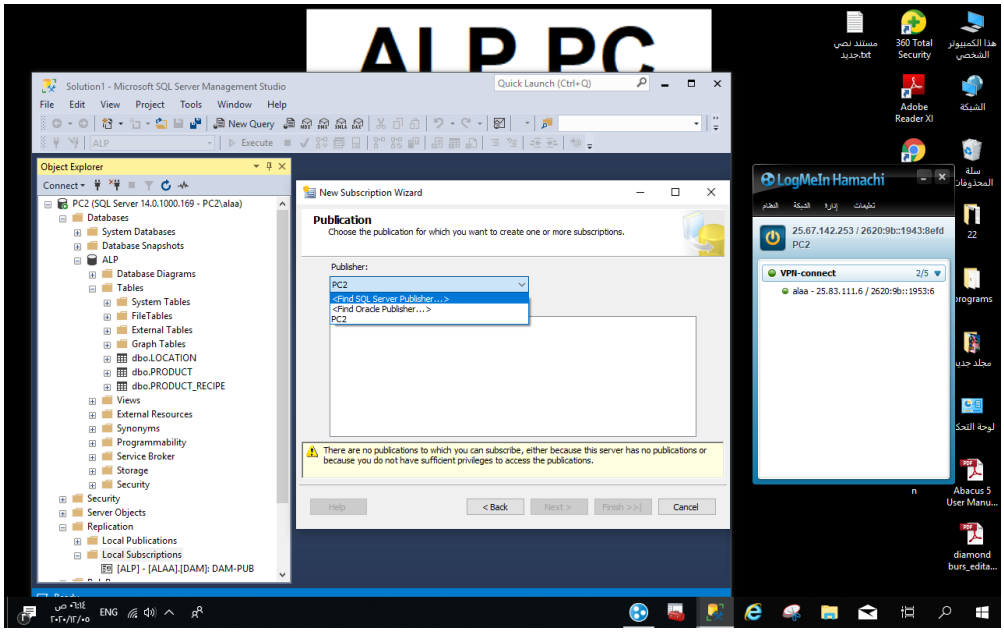
In the second laptop on another server [PC2] (ALEPPO BRANCH)

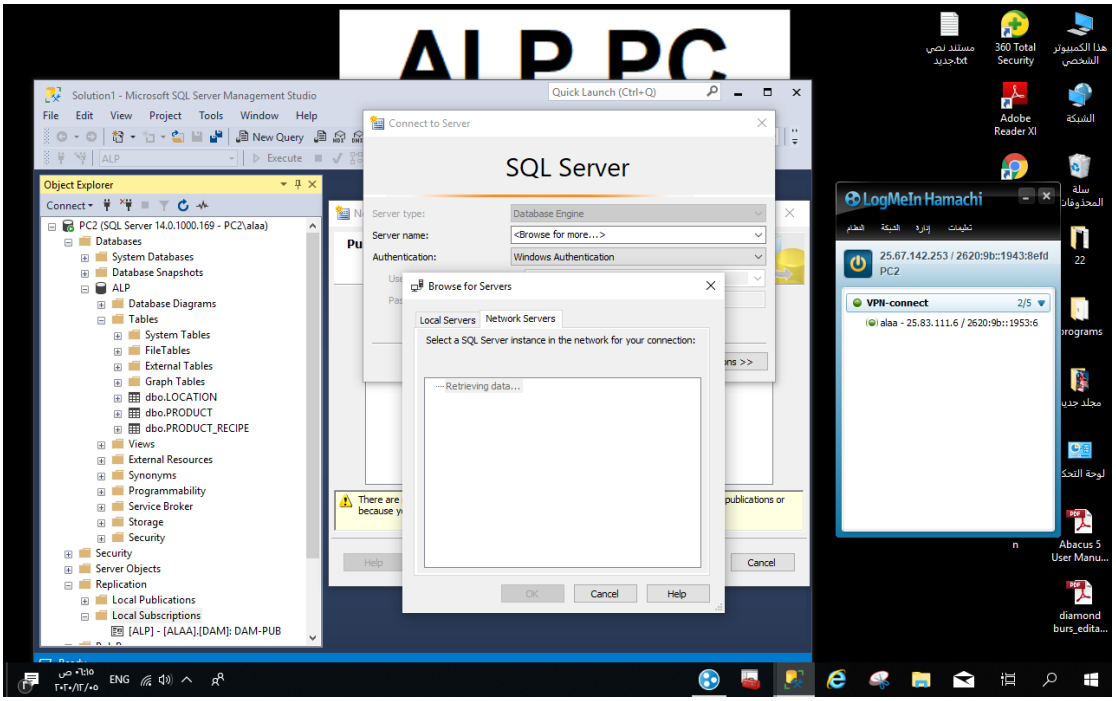
Windows account [PC2\alaa]

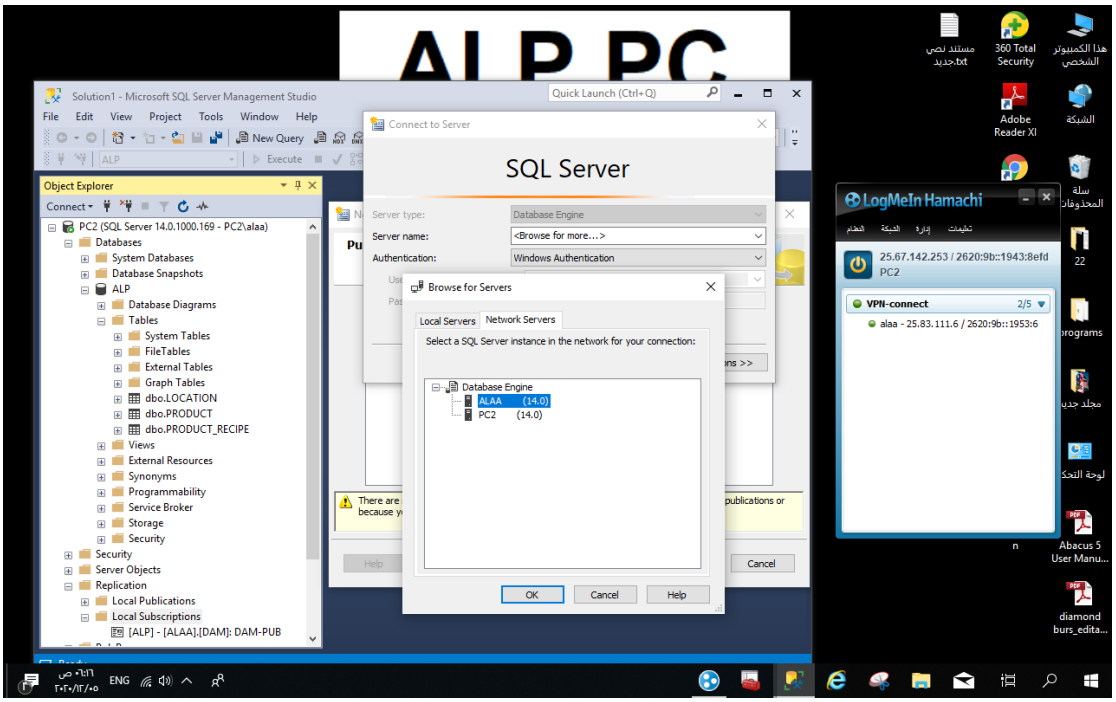
4.2.1. Create a new subscription.

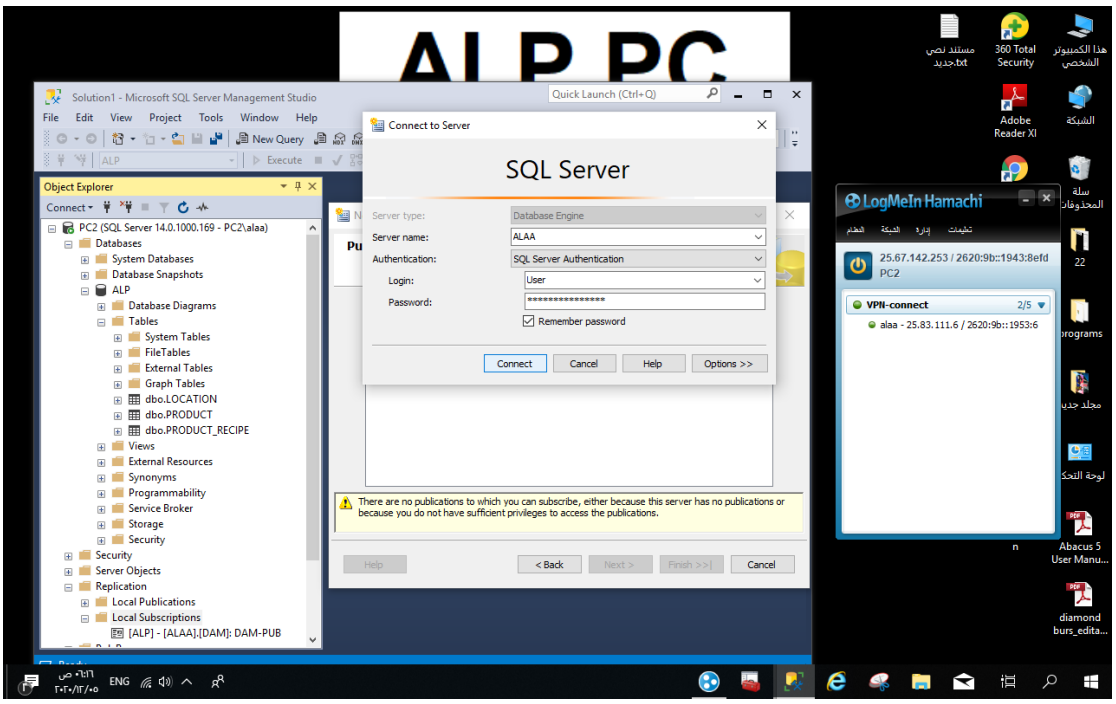


4.2.2. I choose the publisher server.

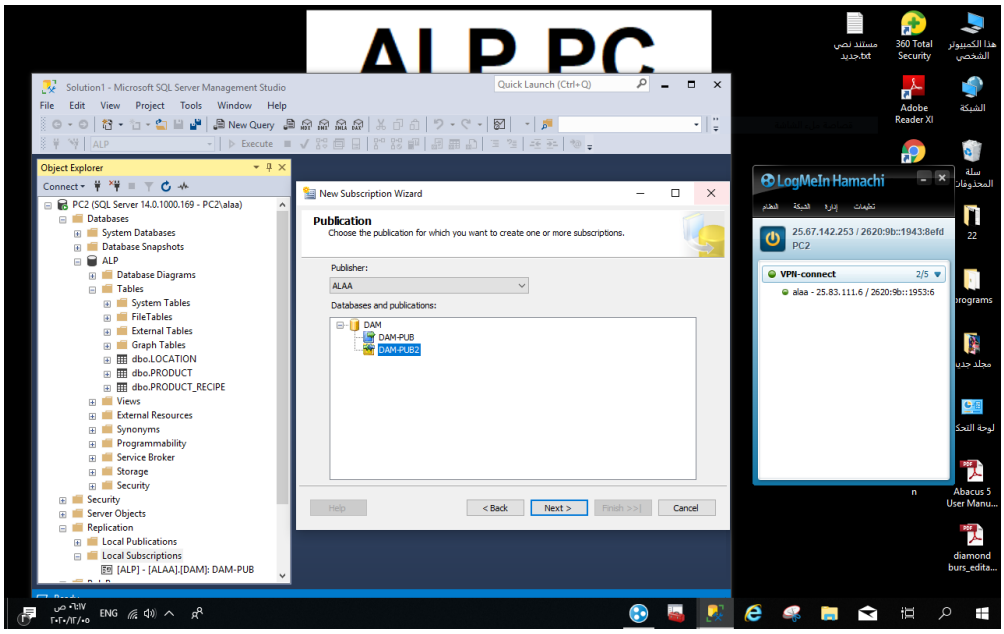



ALP PC
Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Object Explorer
Connect
PC2 (SQL Server 14.0.1000.169 - PC2\alaa)
Databases
System Databases
Database Snapshots
ALP
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.LOCATION
dbo.PRODUCT
dbo.PRODUCT_RECIPE
Views
External Resources
Synonyms
Programmability
Service Broker
Storage
Security
Security
Server Objects
Replication
Local Publications
Local Subscriptions
[ALP] - [ALAA].[DAM]: DAM-PUB
Connect to Server
SQL Server
Server type:
Database Engine
Server name:
<Browse for more...>
Authentication:
Windows Authentication
Browse for Servers
Local Servers
Network Servers
Select a SQL Server instance in the network for your connection:
Retrieving data...
OK
Cancel
Help
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
2/5
alaa - 25.83.111.6 / 2620:9b::1953:6
Adobe Reader XI
360 Total Security
Abacus 5 User Manu...
diamond burs_edita...
ENG

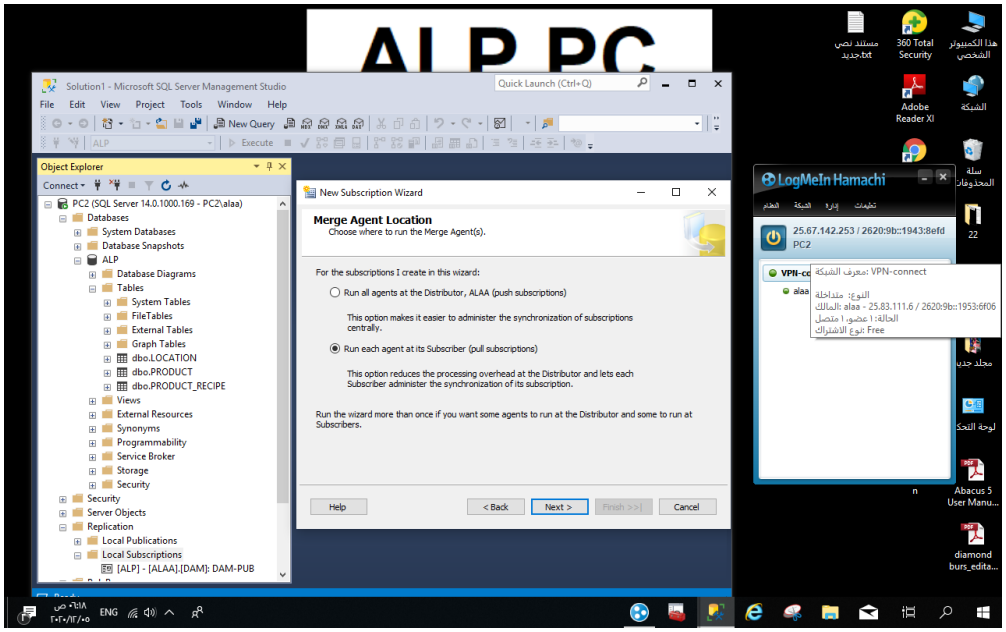

ALP PC
Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Object Explorer
Connect
PC2 (SQL Server 14.0.1000.169 - PC2\alaa)
Databases
System Databases
Database Snapshots
ALP
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.LOCATION
dbo.PRODUCT
dbo.PRODUCT_RECIPE
Views
External Resources
Synonyms
Programmability
Service Broker
Storage
Security
Security
Server Objects
Replication
Local Publications
Local Subscriptions
[ALP] - [ALAA].[DAM]: DAM-PUB
Connect to Server
SQL Server
Server type:
Database Engine
Server name:
<Browse for more...>
Authentication:
Windows Authentication
Browse for Servers
Local Servers
Network Servers
Select a SQL Server instance in the network for your connection:
Database Engine
ALAA (14.0)
PC2 (14.0)
OK
Cancel
Help
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
2/5
alaa - 25.83.111.6 / 2620:9b::1953:6
Adobe Reader XI
360 Total Security
Abacus 5 User Manu...
diamond burs_edita...
ENG



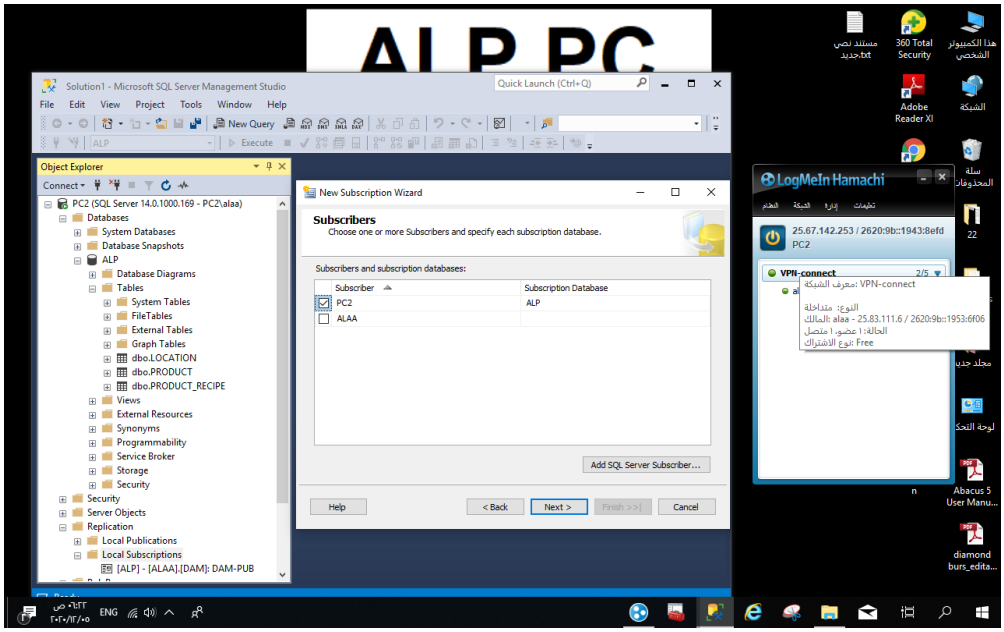
4.2.3. I choose the Publication which I created.



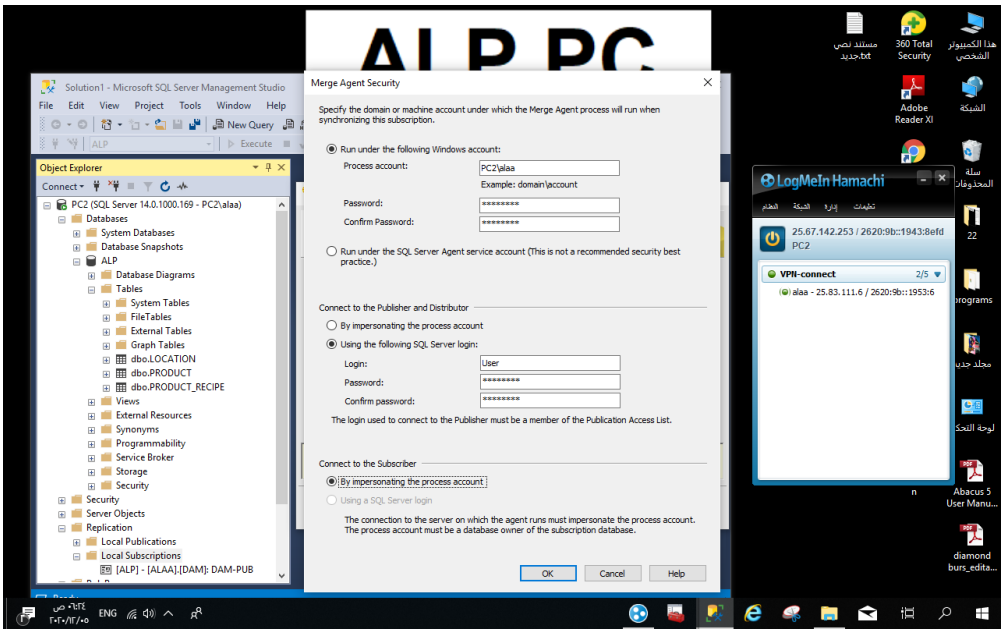
4.2.4. I choose the pull subscription



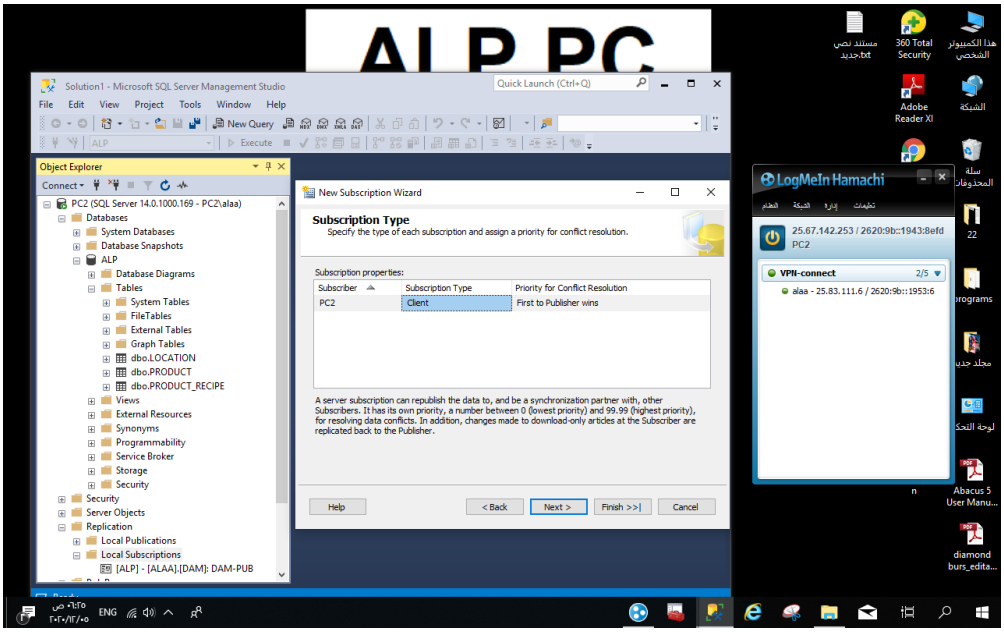
4.2.5. I choose (ALP) database which I want to receive the synchronization.



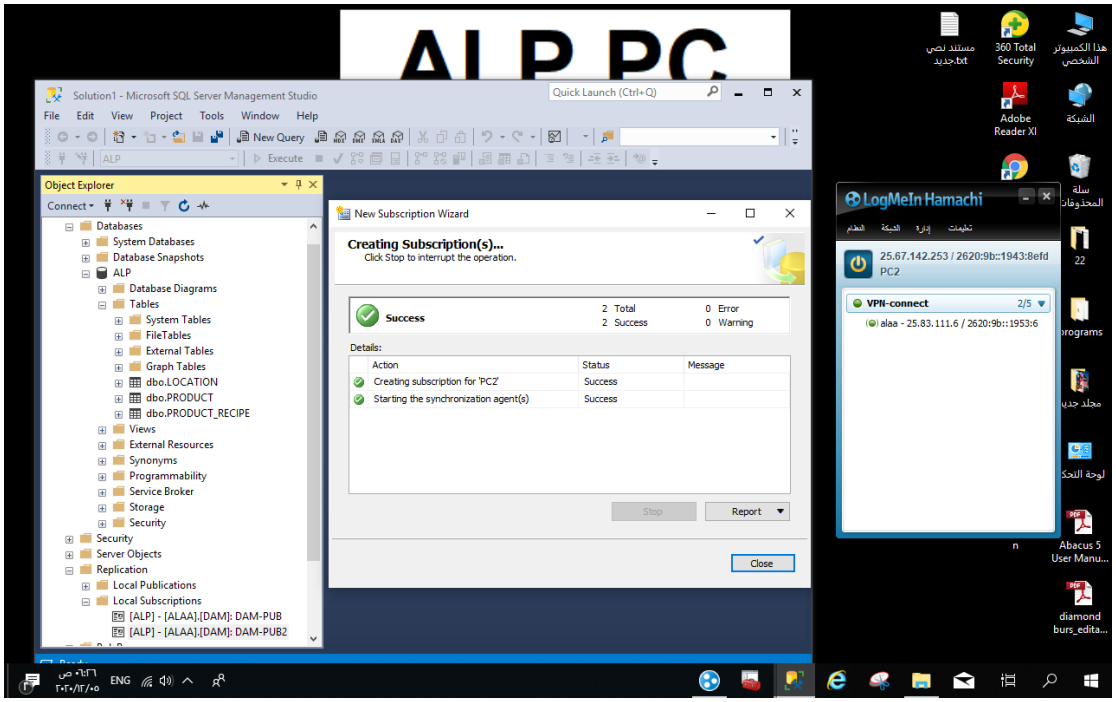
4.2.6. I choose the security method.

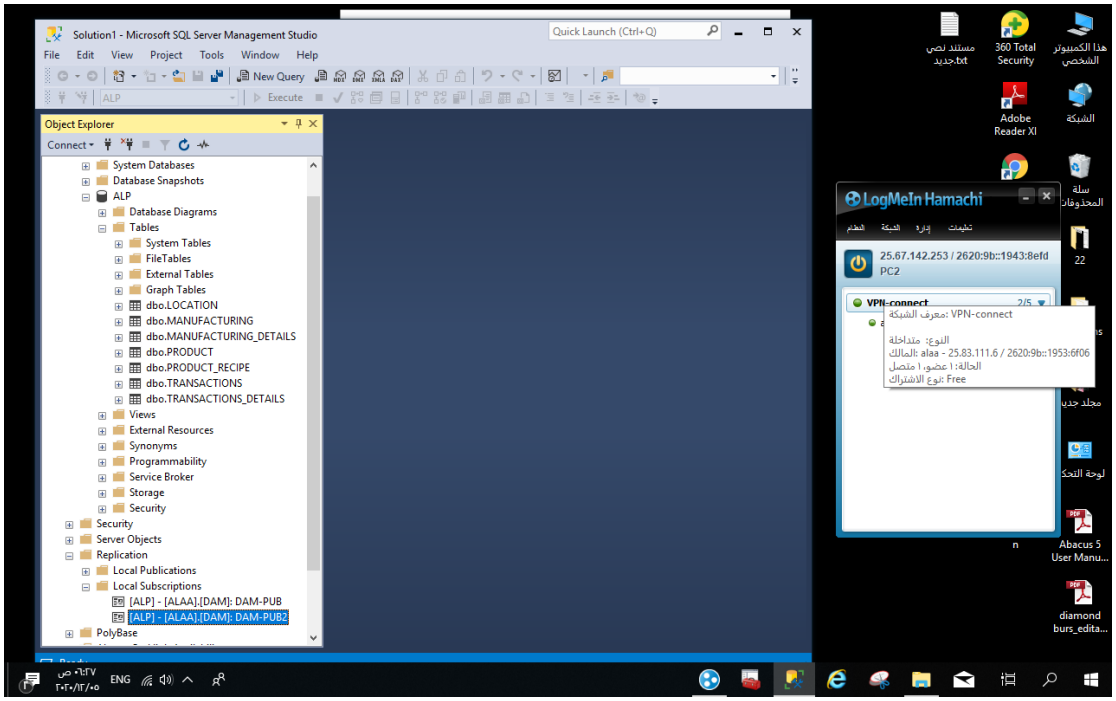


4.2.7. Subscription Type [PC2 client]



4.2.8. The wizard will do the operation and shows a successful result





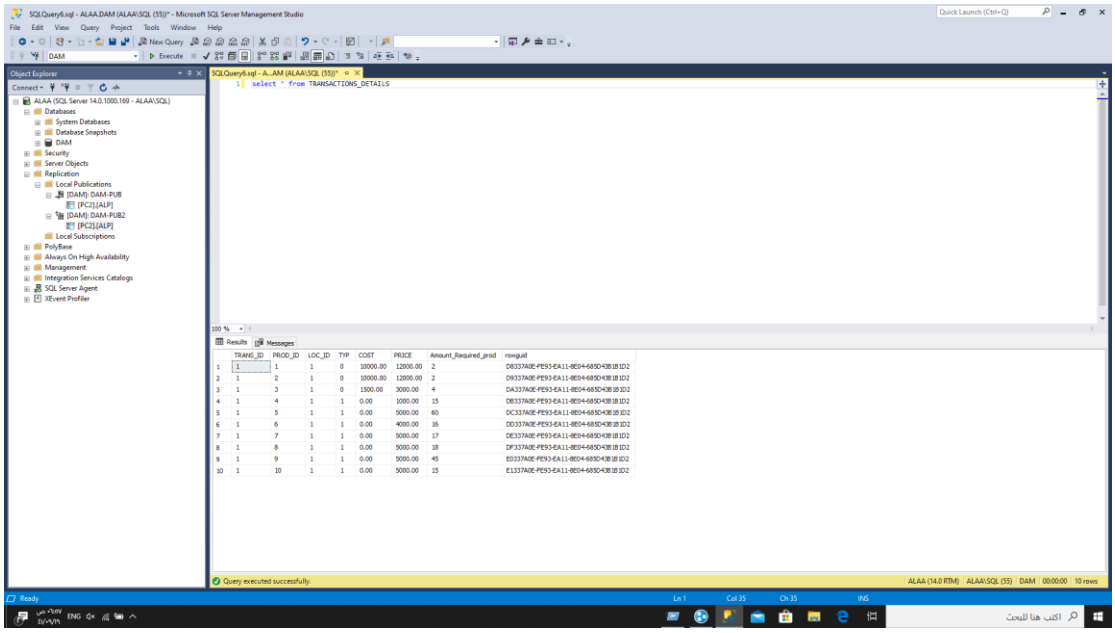
Now You can see synchronize the Manufacturing , Manufacturing_details , Transactions , Transactions_details **bidirectional**

4.3. Test the Synchronize Bidirectional

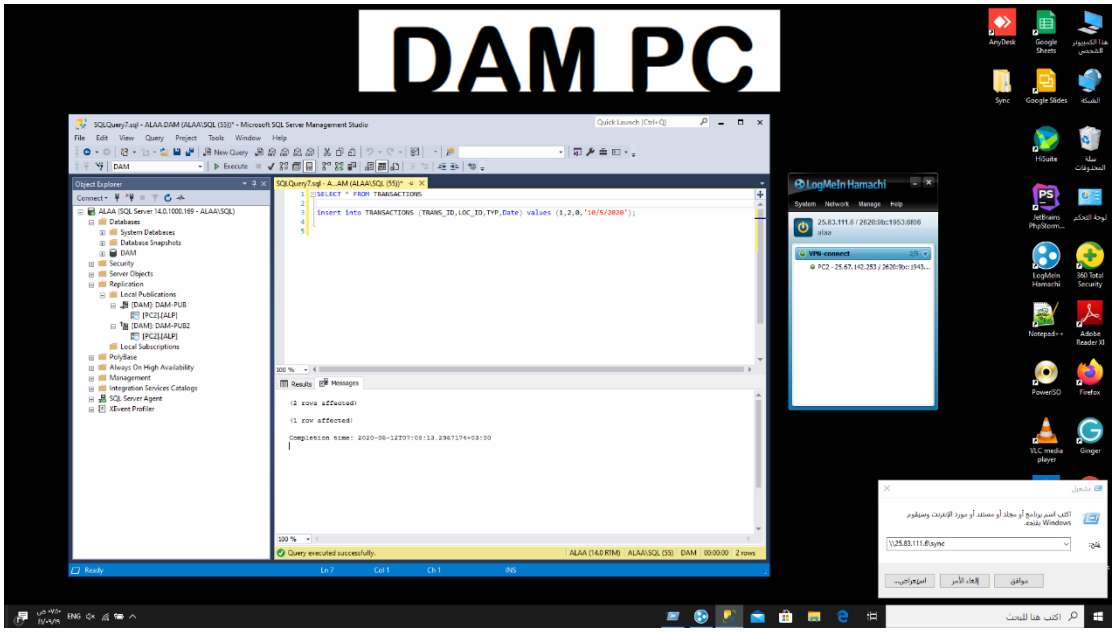
In DAM: after Synchronize

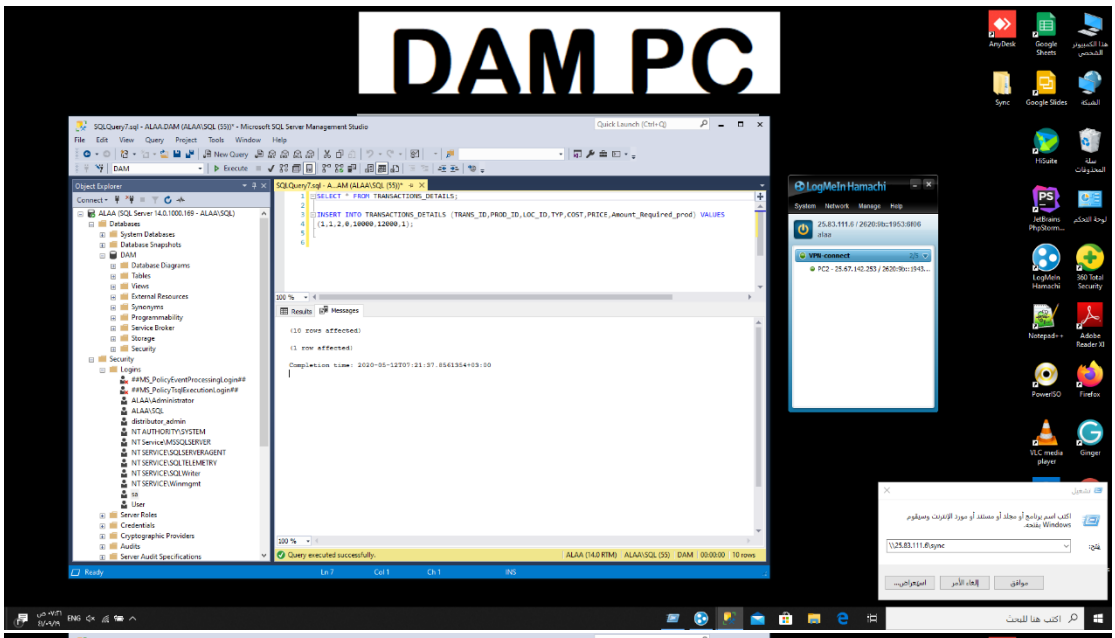
I insert one row in Transactions table & two rows in Transactions_details
[Add a new sale Transactions (TRANS_ID=2, LOC_ID=2, TYP=0)]
[Add two sales for product PROD_ ID= 1 (table)]

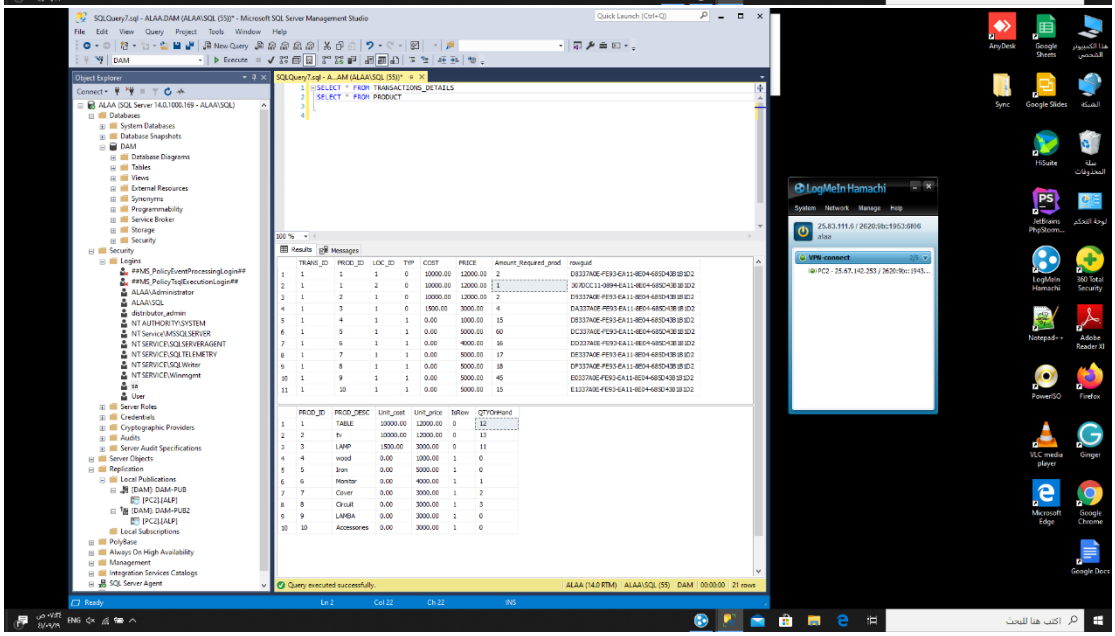
Before insert:



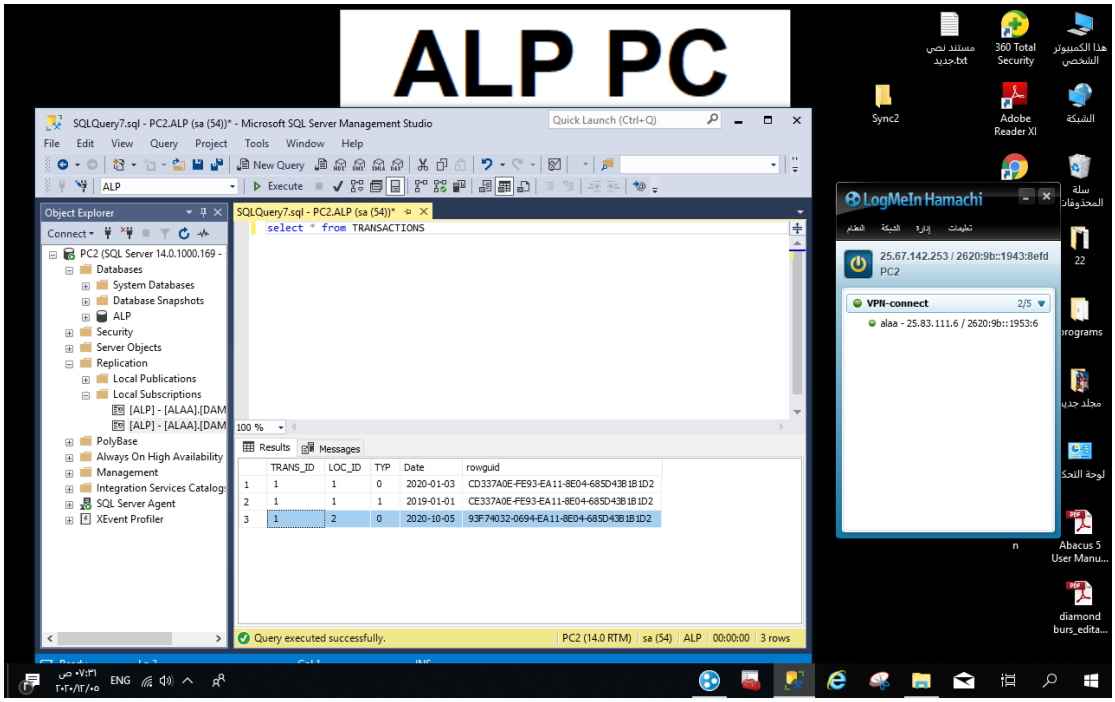
After **first insert** on Transactions, Transactions_details from **DAM**:

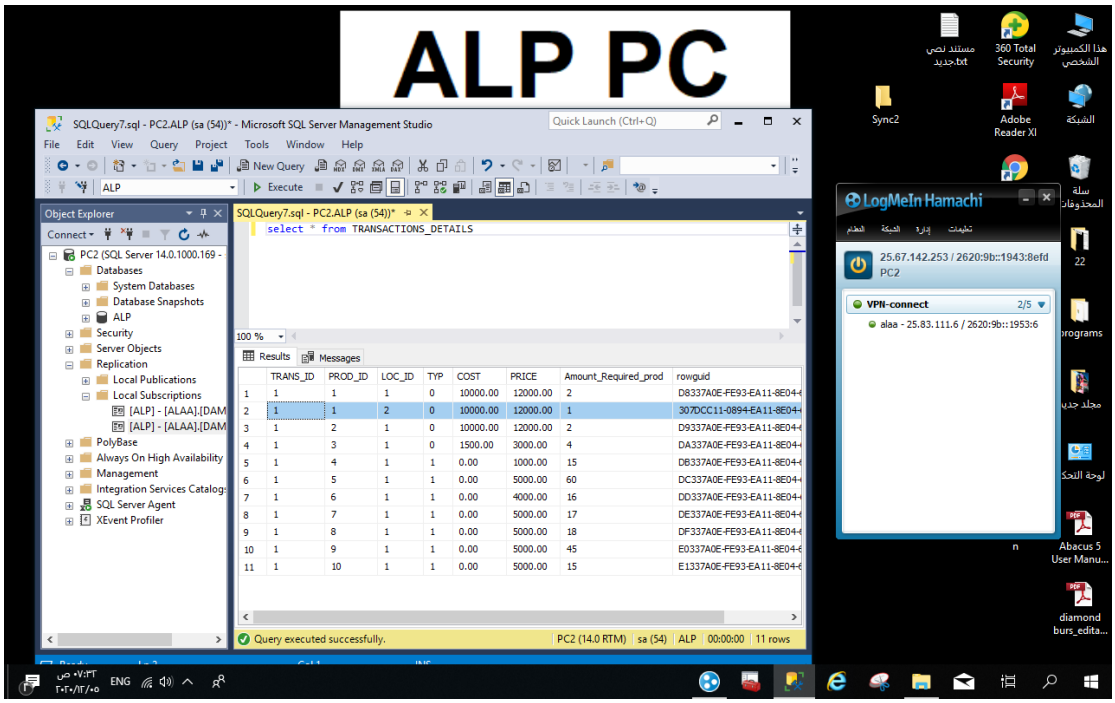



DAM PC

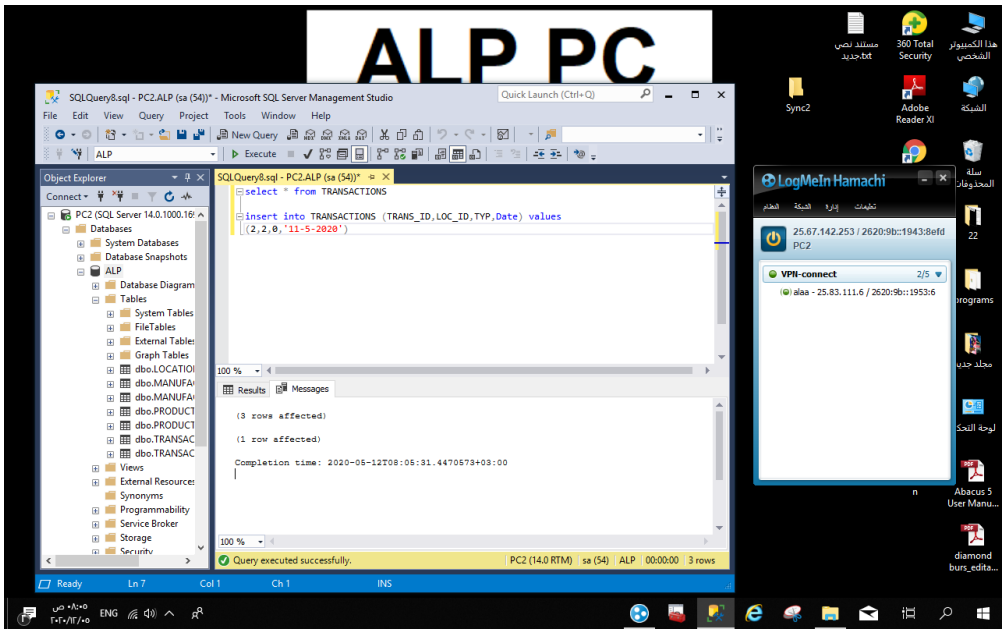


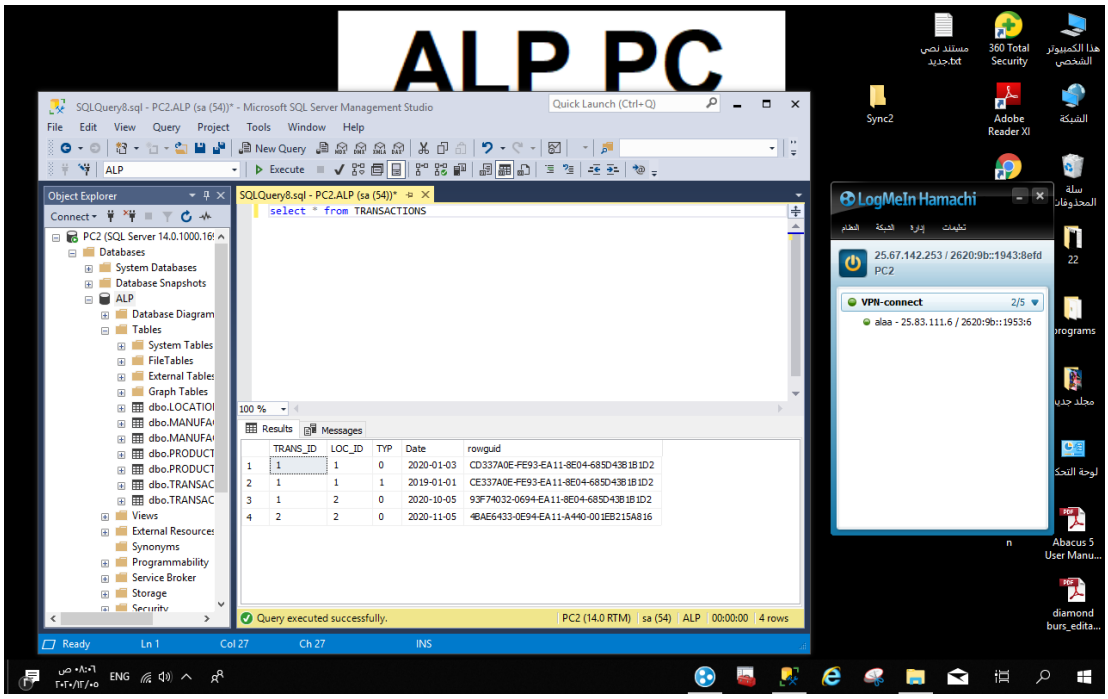
You will can see the change in ALP:

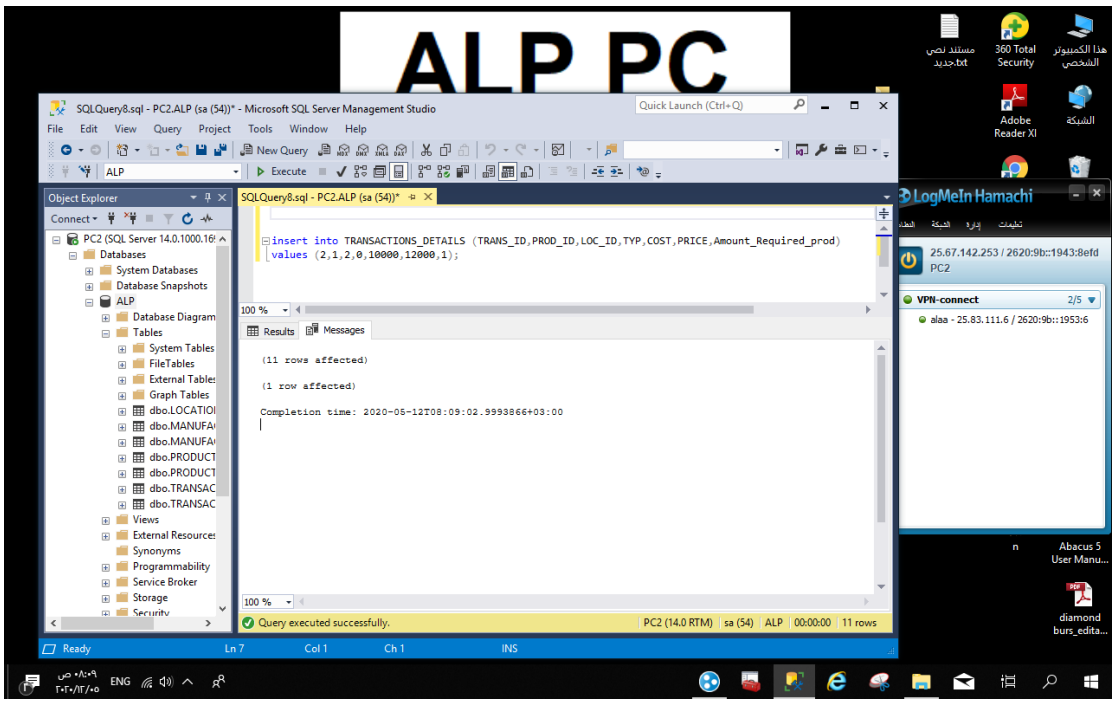


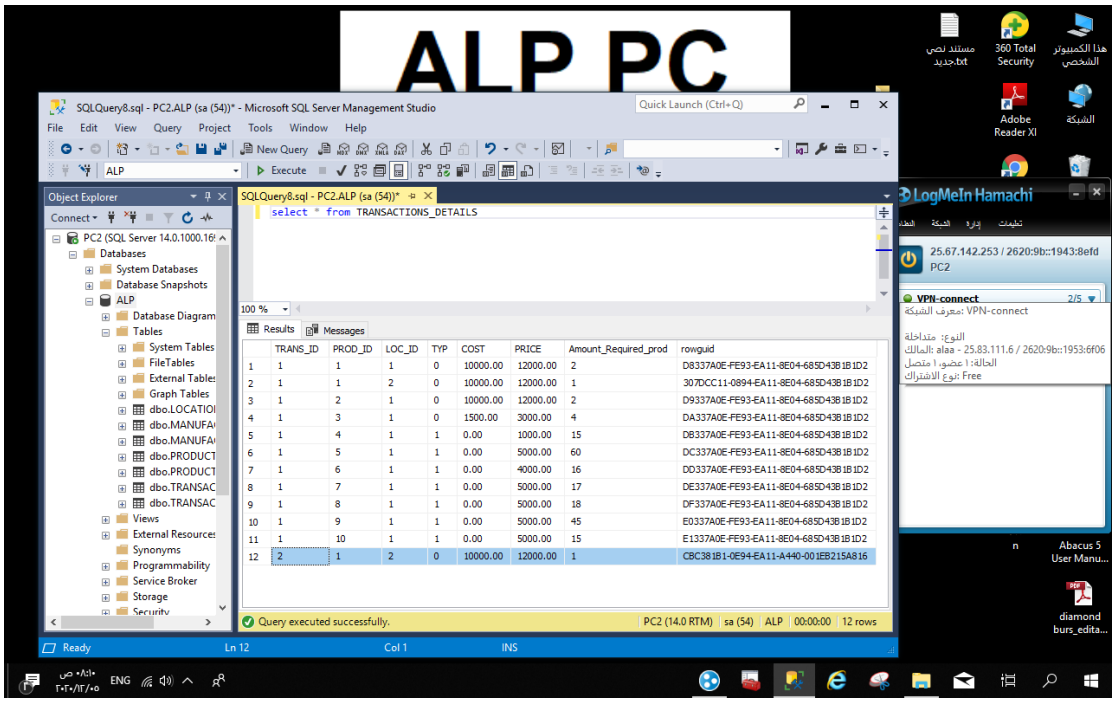


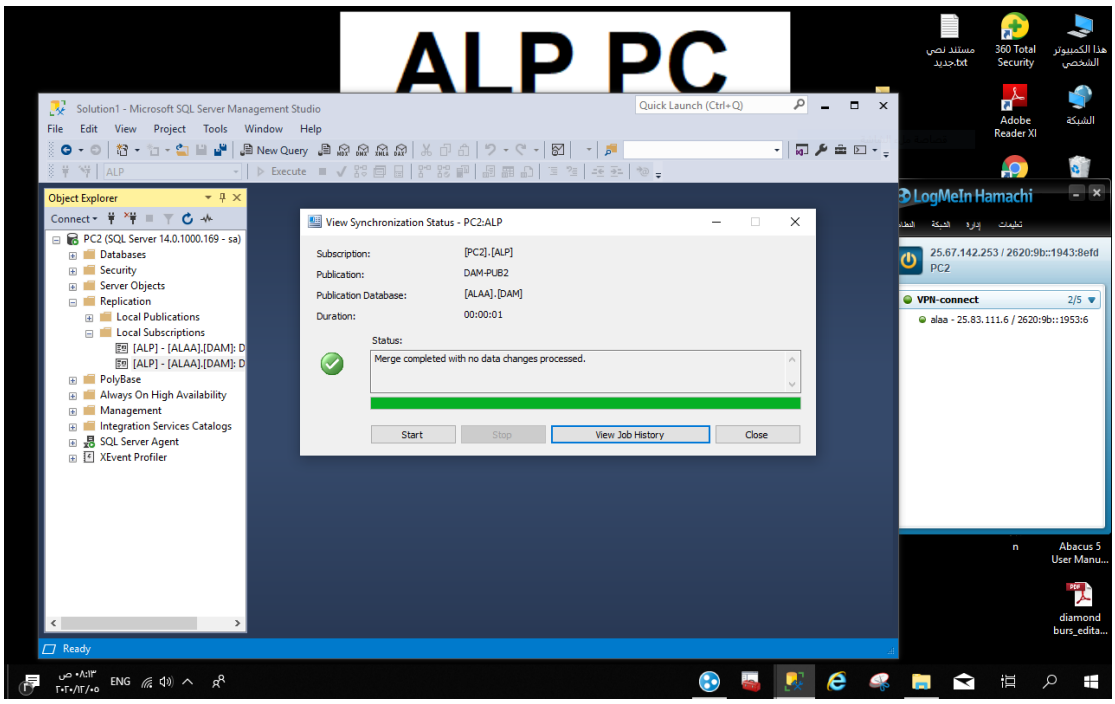
After **second insert** on Transactions, Transactions_details from **ALP**:



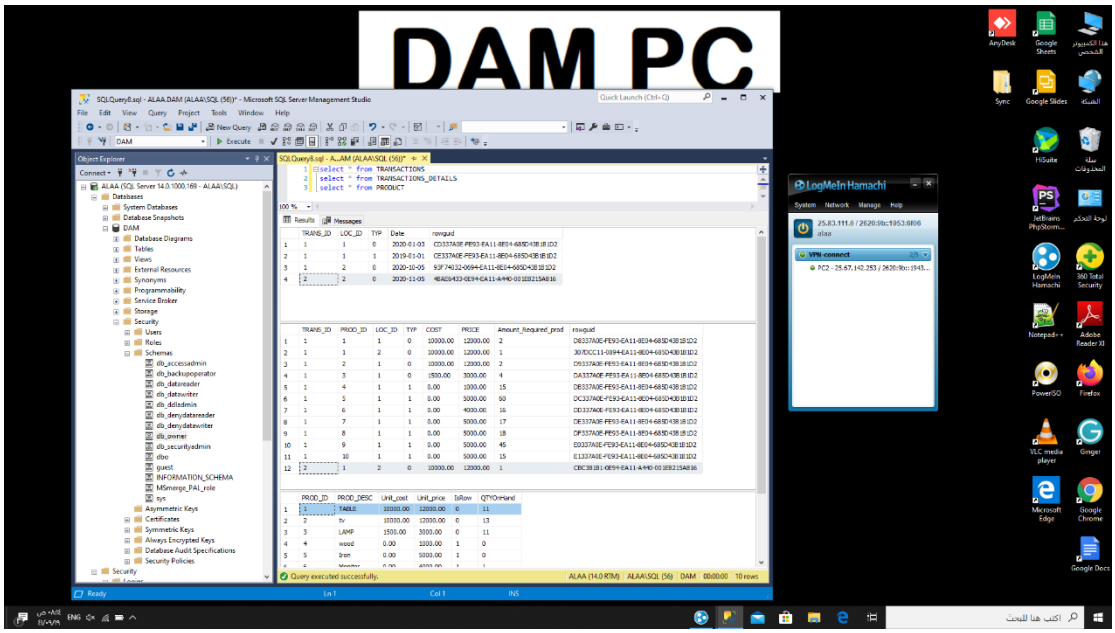



ALP PC
SQLQuery8.sql - PC2.ALP (sa (54))* - Microsoft SQL Server Management Studio
insert into TRANSACTIONS_DETAILS (TRANS_ID,PROD_ID,LOC_ID,TYP,COST,PRICE,Amount_Required_prod)
values (2,1,2,0,10000,12000,1);
(11 rows affected)
(1 row affected)
Completion time: 2020-05-12T08:09:02.9993866+03:00
Query executed successfully.
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
alaa - 25.83.111.6 / 2620:9b::1953:6


ALP PC
SQLQuery8.sql - PC2.ALP (sa (54))* - Microsoft SQL Server Management Studio
select * from TRANSACTIONS_DETAILS
TRANS_ID PROD_ID LOC_ID TYP COST PRICE Amount_Required_prod rowguid
1 1 1 1 0 10000.00 12000.00 2 D8337A0E-FE93-EA11-8E04-685D43B1B1D2
2 1 1 2 0 10000.00 12000.00 1 307DCC11-0894-EA11-8E04-685D43B1B1D2
3 1 2 1 0 10000.00 12000.00 2 D9337A0E-FE93-EA11-8E04-685D43B1B1D2
4 1 3 1 0 1500.00 3000.00 4 DA337A0E-FE93-EA11-8E04-685D43B1B1D2
5 1 4 1 1 0.00 1000.00 15 DB337A0E-FE93-EA11-8E04-685D43B1B1D2
6 1 5 1 1 0.00 5000.00 60 DC337A0E-FE93-EA11-8E04-685D43B1B1D2
7 1 6 1 1 0.00 4000.00 16 DD337A0E-FE93-EA11-8E04-685D43B1B1D2
8 1 7 1 1 0.00 5000.00 17 DE337A0E-FE93-EA11-8E04-685D43B1B1D2
9 1 8 1 1 0.00 5000.00 18 DF337A0E-FE93-EA11-8E04-685D43B1B1D2
10 1 9 1 1 0.00 5000.00 45 E0337A0E-FE93-EA11-8E04-685D43B1B1D2
11 1 10 1 1 0.00 5000.00 15 E1337A0E-FE93-EA11-8E04-685D43B1B1D2
12 2 1 2 0 10000.00 12000.00 1 CBC381B1-0E94-EA11-A440-001EB215A816
Query executed successfully.
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect



You will can see the change in DAM:

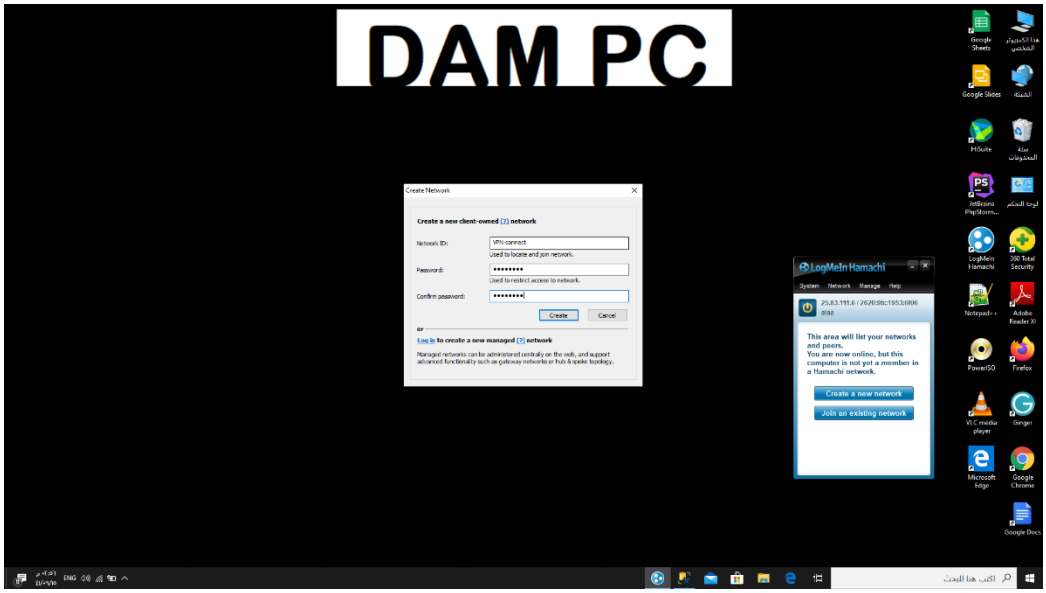


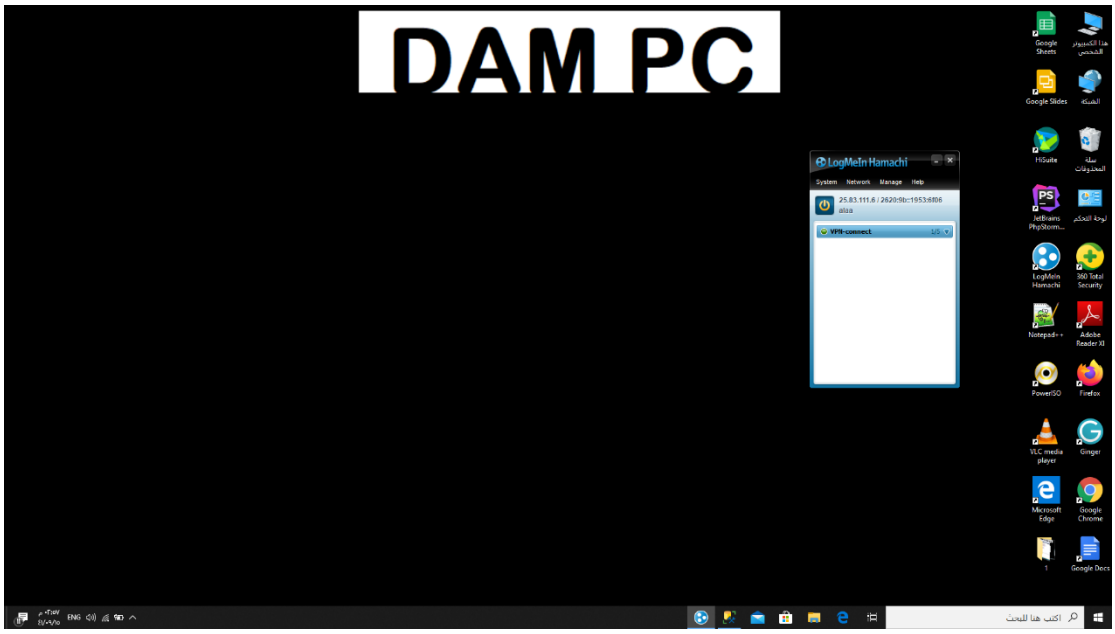
5. Appendix

5.1. Vpn with Hamachi

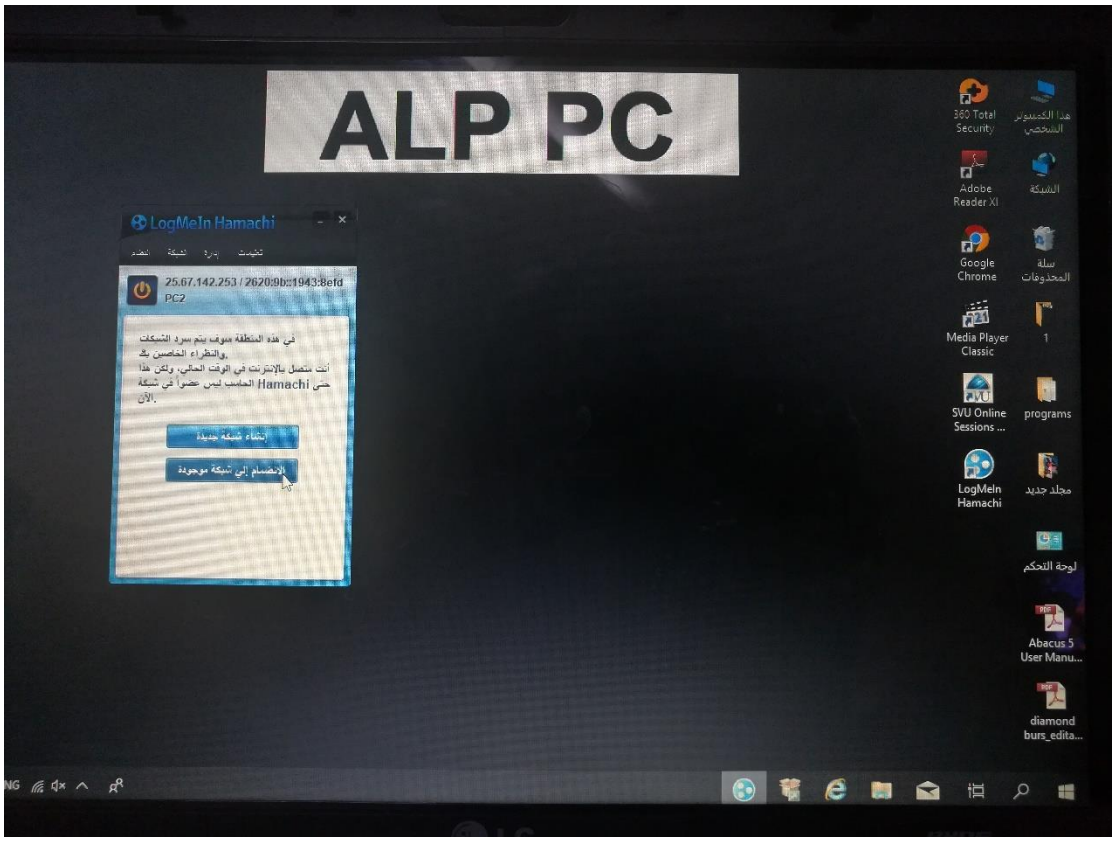
5.1.1. After install Hamachi app on two computers, I should have two (LogMeIn) IDs.

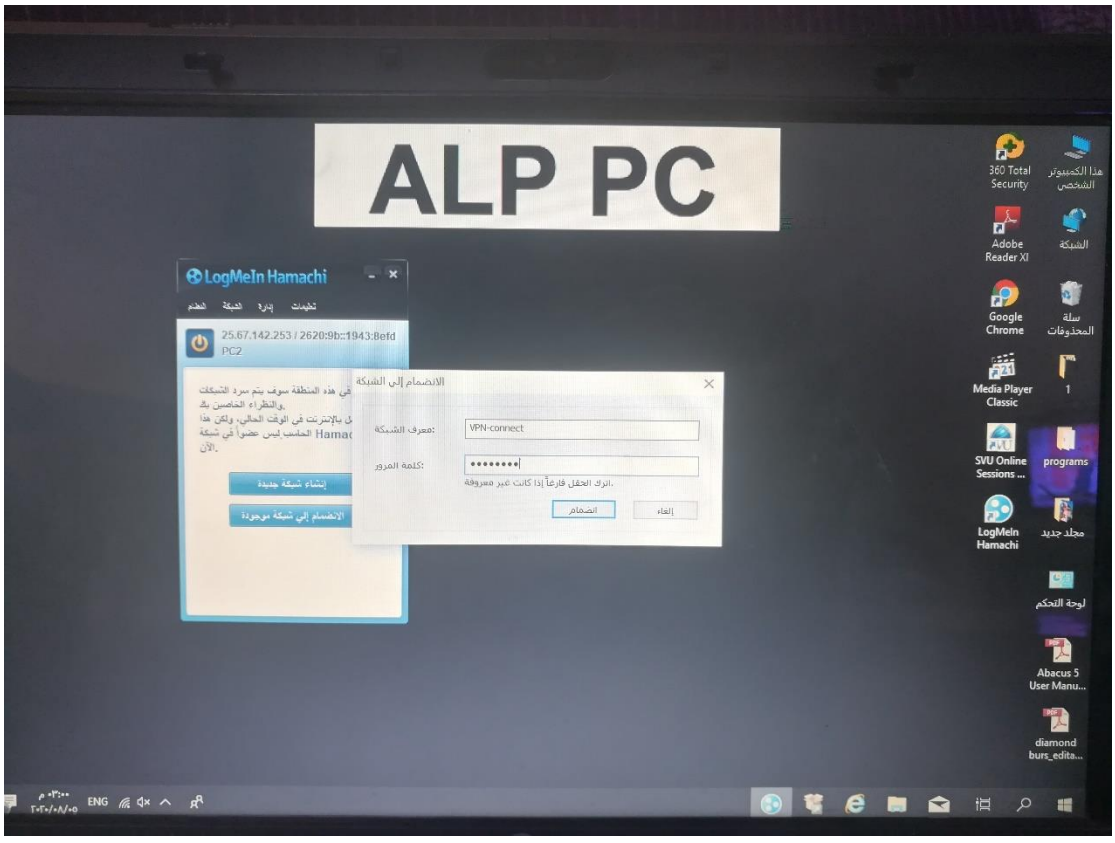
5.1.2. Create a new network

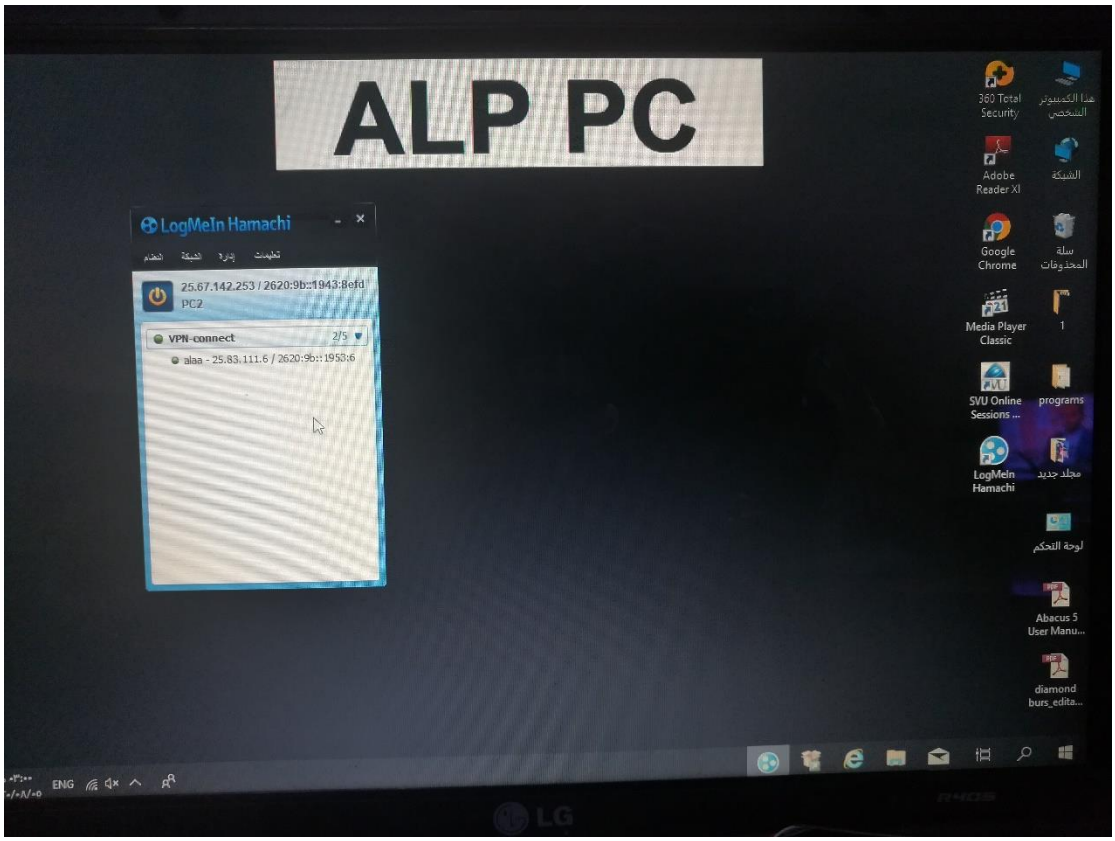


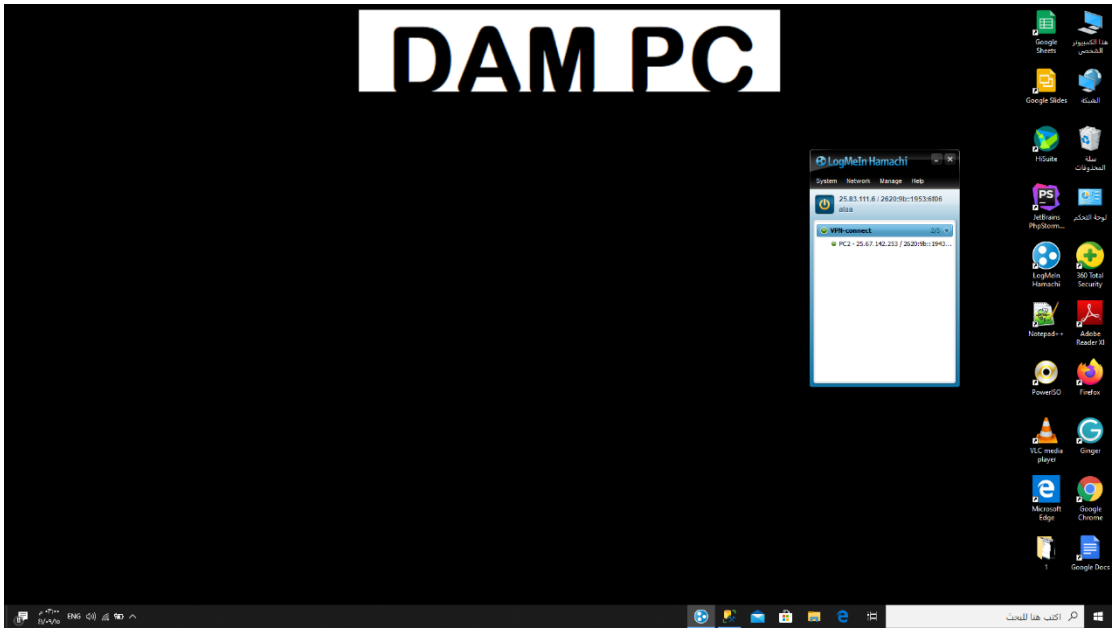


5.1.3. From second PC, I connect to previous network

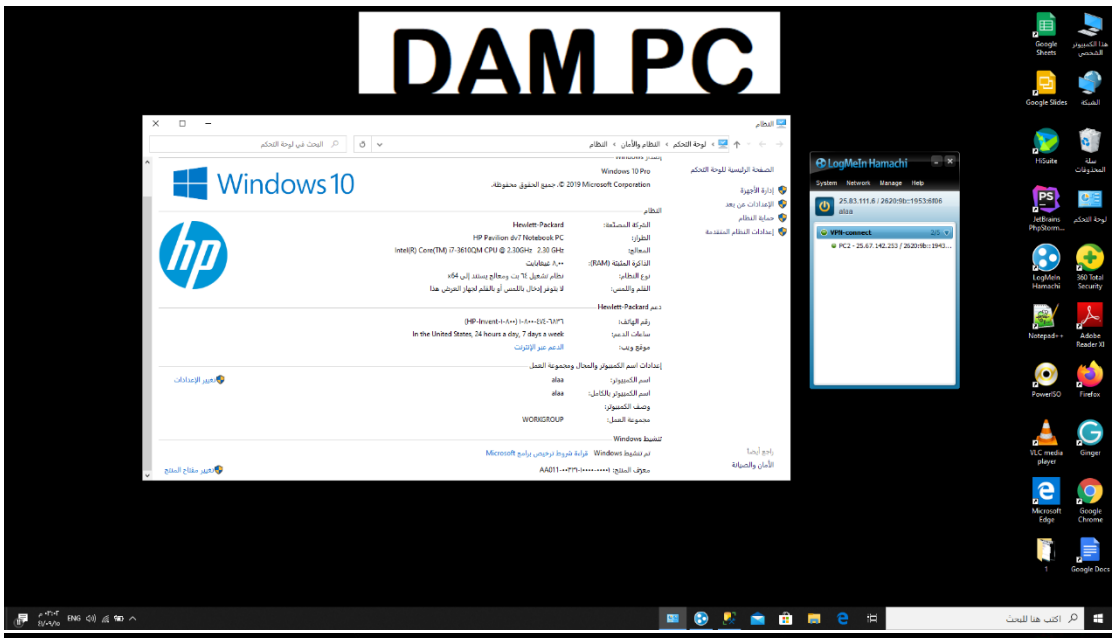


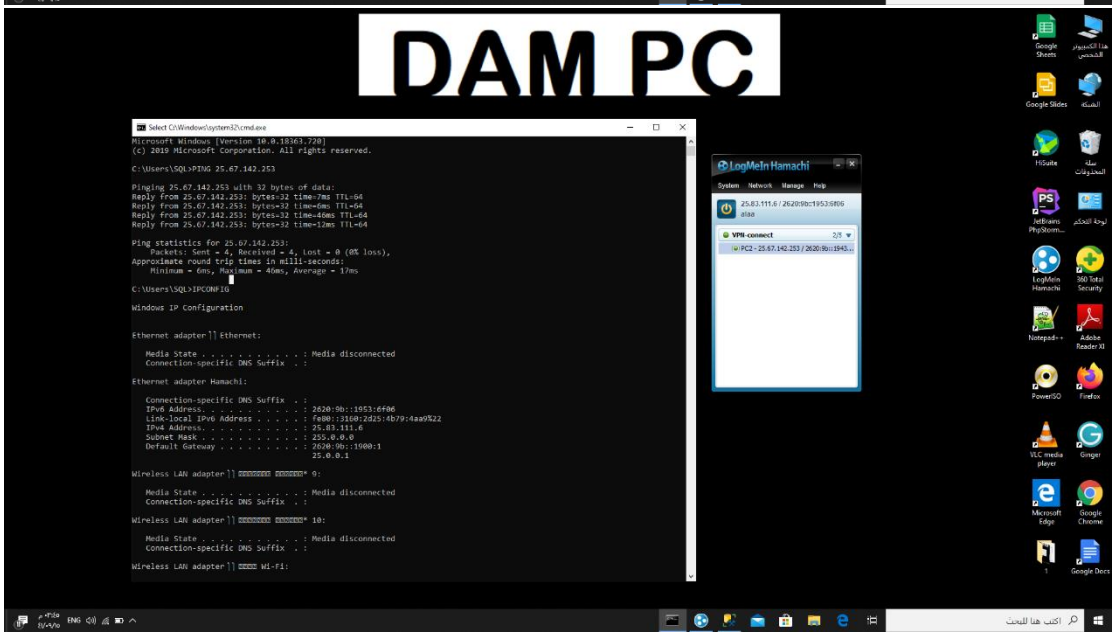


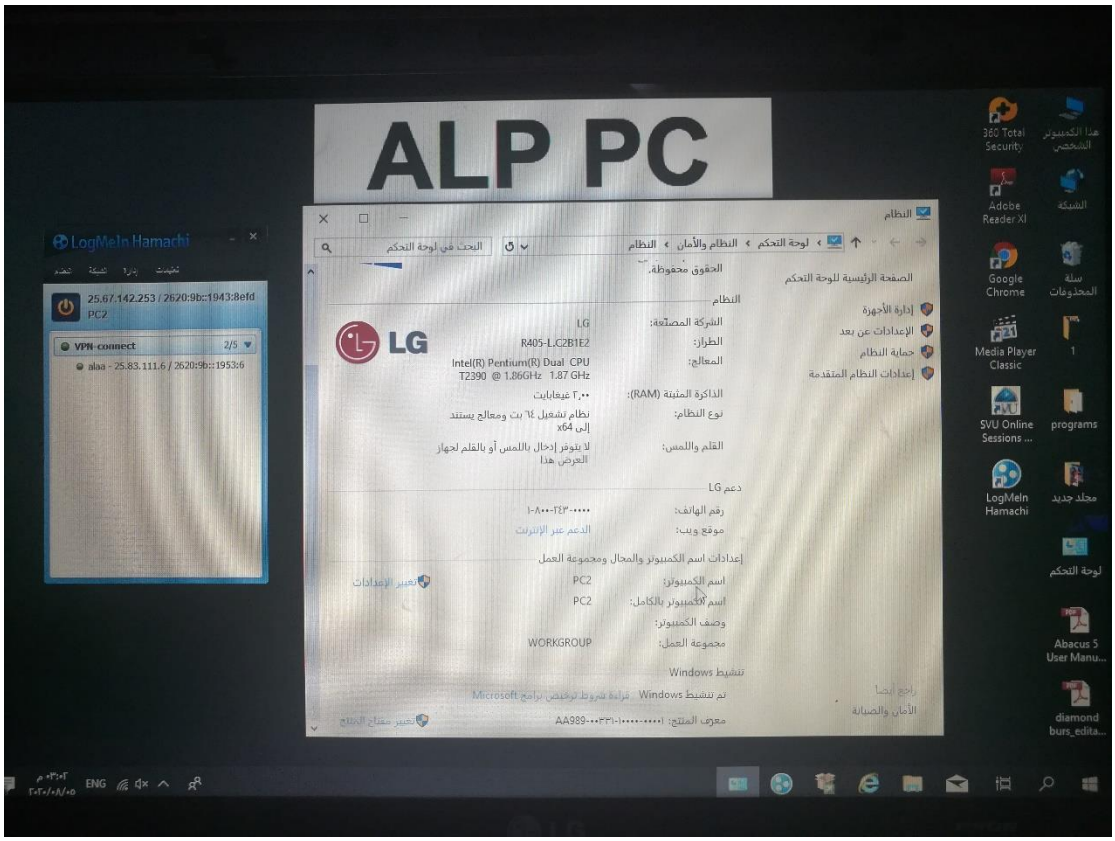


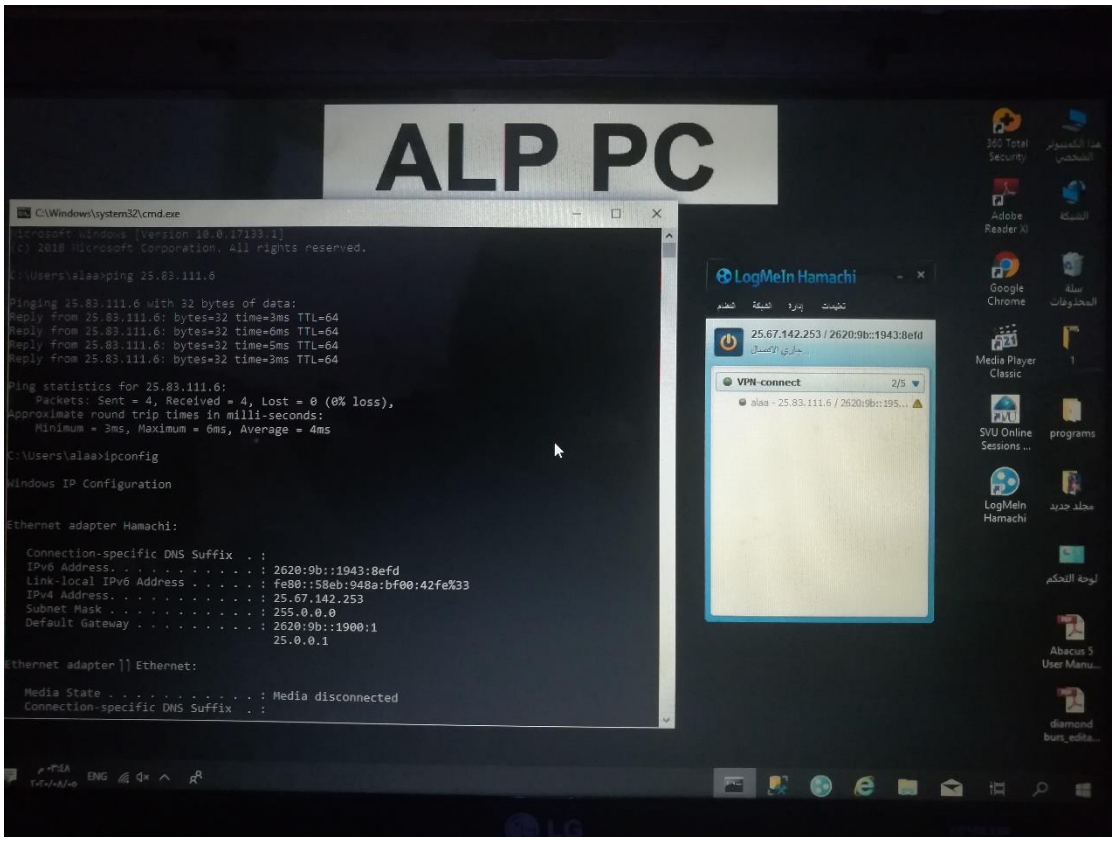


Now two PCs (DAM + ALP) connect over internet via VPN.


DAM PC
Windows 10
LogMeIn Hamachi


DAM PC
Select C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.18363.720]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\SQL>PING 25.67.142.253
Pinging 25.67.142.253 with 32 bytes of data:
Reply from 25.67.142.253: bytes=32 time=7ms TTL=64
Reply from 25.67.142.253: bytes=32 time=6ms TTL=64
Reply from 25.67.142.253: bytes=32 time=46ms TTL=64
Reply from 25.67.142.253: bytes=32 time=12ms TTL=64
Ping statistics for 25.67.142.253:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 46ms, Average = 17ms
C:\Users\SQL>IPCONFIG
Windows IP Configuration
Ethernet adapter Ethernet:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Ethernet adapter Hamachi:
Connection-specific DNS Suffix . :
IPv6 Address. . . . . : 2620:9b::1953:6f06
Link-local IPv6 Address . . . . . : fe80::3100:2d25:4b79:4aa9%22
IPv4 Address. . . . . : 25.83.111.6
Subnet Mask . . . . . : 255.0.0.0
Default Gateway . . . . . : 2620:9b::1000:1
25.0.0.1
Wireless LAN adapter
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Wireless LAN adapter
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Wireless LAN adapter
LogMeIn Hamachi


ALP PC
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
PC2
VPN-connect
alaa - 25.83.111.6 / 2620:9b::1953:6
النظام
لوحة التحكم › النظام والأمان › النظام
البحث في لوحة التحكم
الصفحة الرئيسية للوحة التحكم
إدارة الأجهزة
الإعدادات عن بعد
حماية النظام
إعدادات النظام المتقدمة
النظام
الشركة المصنّعة: LG
الطراز: R405-L.G2B1E2
المعالج: Intel(R) Pentium(R) Dual CPU T2390 @ 1.86GHz 1.87 GHz
الذاكرة المثبتة (RAM): ٢,٠٠ غيغابايت
نوع النظام: نظام تشغيل ٦٤ بت ومعالج يستند إلى x64
القلم واللمس: لا يتوفر إدخال باللمس أو بالقلم لهذا العرض
دعم LG
رقم الهاتف: ١-٨٠٠-٢٤٣-••••
موقع ويب: الدعم عبر الإنترنت
إعدادات اسم الكمبيوتر والمجال ومجموعة العمل
اسم الكمبيوتر: PC2
اسم الكمبيوتر بالكامل: PC2
وصف الكمبيوتر:
مجموعة العمل: WORKGROUP
تغيير الإعدادات
تنشيط Windows
تم تنشيط Windows. قراءة شروط ترخيص برامج Microsoft
معرف المنتج: AA989-•••-•••••-••••1
تغيير مفتاح المنتج
راجع أيضاً
الأمان والصيانة
360 Total Security
هذا الكمبيوتر الشخصي
Adobe Reader XI
الشبكة
Google Chrome
سلة المحذوفات
Media Player Classic
1
SVU Online Sessions ...
programs
LogMeIn Hamachi
مجلد جديد
لوحة التحكم
Abacus 5 User Manu...
diamond burs_edita...
ENG


ALP PC
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.17133.1]
(c) 2018 Microsoft Corporation. All rights reserved.
C:\Users\alaa>ping 25.83.111.6
Pinging 25.83.111.6 with 32 bytes of data:
Reply from 25.83.111.6: bytes=32 time=3ms TTL=64
Reply from 25.83.111.6: bytes=32 time=6ms TTL=64
Reply from 25.83.111.6: bytes=32 time=5ms TTL=64
Reply from 25.83.111.6: bytes=32 time=3ms TTL=64
Ping statistics for 25.83.111.6:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 3ms, Maximum = 6ms, Average = 4ms
C:\Users\alaa>ipconfig
Windows IP Configuration
Ethernet adapter Hamachi:
Connection-specific DNS Suffix . :
IPv6 Address. . . . . : 2620:9b::1943:8efd
Link-local IPv6 Address . . . . . : fe80::58eb:948a:bf00:42fe%33
IPv4 Address. . . . . : 25.67.142.253
Subnet Mask . . . . . : 255.0.0.0
Default Gateway . . . . . : 2620:9b::1900:1
25.0.0.1
Ethernet adapter Ethernet:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
LogMeIn Hamachi
25.67.142.253 / 2620:9b::1943:8efd
VPN-connect
2/5
LogMeIn Hamachi
Media Player Classic
SVU Online Sessions ...
programs
Abacus 5 User Manu...
diamond burs_edita...

Thank you, Mr. Ayham

You give your best to see others move forward