Asset Manager

Moving Data Across Tenants With Advanced Solution

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Introduction

In a multi-tenancy environment, when trying to move data across tenants with conventional approaches, customers may encounter one of the following issues.

- **Performance issue**
  It takes a large amount of time to move even a small chunk of data.

- **Unexpected data is moved to the target tenant**
  There are some "weak links" between tables. For this kind of links, when the data on one side of the link is moved to the target tenant, the data on the other side does not have to be moved to the target tenant as well. For example, a record of a computer is moved to Tenant A, but the modifier of this computer is an employee, the employee record is not supposed to be moved to Tenant A along with the computer record. Whether this kind of links should not be moved together is determined by the business behavior.
 With the conventional approaches, there is a potential possibility that "weak links" are not moved as expected.

- **Integrity of the multi-tenancy rule (ITR) problem**
  When you move some records of a table to Tenant A, and then move some records of another table to Tenant B. If these two tables are linked, the existence of these records violates the ITR. In this case, you must use the diagnostic tool to detect and fix these records. The number of this kind of records may be extremely large.
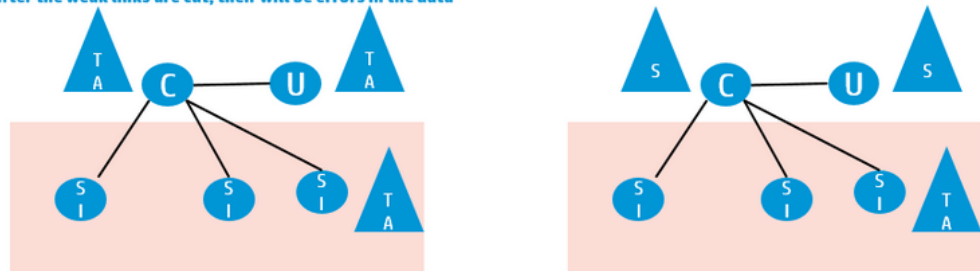
Who is this guide intended for?

This guide is intended for Asset Manager administrators and support staff responsible for implementing, customizing and troubleshooting the MT system.

Caution: Only an administrator with in-depth knowledge of the structure of your Asset Manager production database and the relationship between tables is qualified to move data across tenants. Otherwise, the integrity of your database may be damaged.

Solution overview

In Asset Manager 9.41 Patch 4 and Asset Manager 9.50 Patch 3, an advanced solution is introduced to provide user interface to move data across tenants. The solution does not automatically move data to multiple tenants based on the business behavior, it only consists of a

series of steps that let users select the link hierarchy of the root table based on the business behavior and then move data to tenants.

For more information about the link hierarchy and the root table, see Step 2. Update the temporary tenant column.

This solution is more convenient than the "Manually input filter for each table" option, and it has better performance than the "Resolve dependency for the following set of records" option.

The "Manually input filter for each table" option and the "Resolve dependency for the following set of records" option are the solution which we already have for moving data across tenants, you can find more information from the Asset Manager Multi-Tenancy guide, Chapter "Moving data across tenants".

This white paper describes an advanced solution that enables you to move data across tenants.

This advanced solution:

- It allows you to select the links to bind with the root table. It helps:
    - Avoid recursive query.
    - Improve performance.
    - Choose the link hierarchy and cover more data.
    - Avoid unexpected data move.
- It removes "weak links". Weak links are not necessary in the progress of moving data, this kind of links are removed in the UI so that the link structure of the root table changes from the graphic structure to the tree structure. It improves the performance as well.
- It introduces a temporary tenant column. In the process of moving data, instead of updating the value of the real tenant column, Asset Manager only stores each target tenant name in a temporary tenant column, and then detects how many records are moved to more than one tenant. By using this temporary tenant column, you can identify the number of the records that are moved to more than one tenant, thereby choosing an appropriate root table and link hierarchy. Then, you can manually fix these records with the information in the temporary column.
- In the data moving process, you may have missed some data, which can breach the integrity of the multi-tenancy rule (ITR). The advanced solution uses the diagnostic tool to detect this kind of data.

## Before you use the advanced solution

Before you use the advanced solution, the following actions are required.

1. Back up your database.
2. Make sure that end users, APM, push adapters and so on cannot connect to the database during the process of the solution.
3. This solution is not supported on the web client of Asset Manager.
4. This solution requires a user account with administrator user role.

Note: Archived database is not supported.

The advanced solution contains 6 steps to complete moving data across tenants, see the following diagram for an overview.
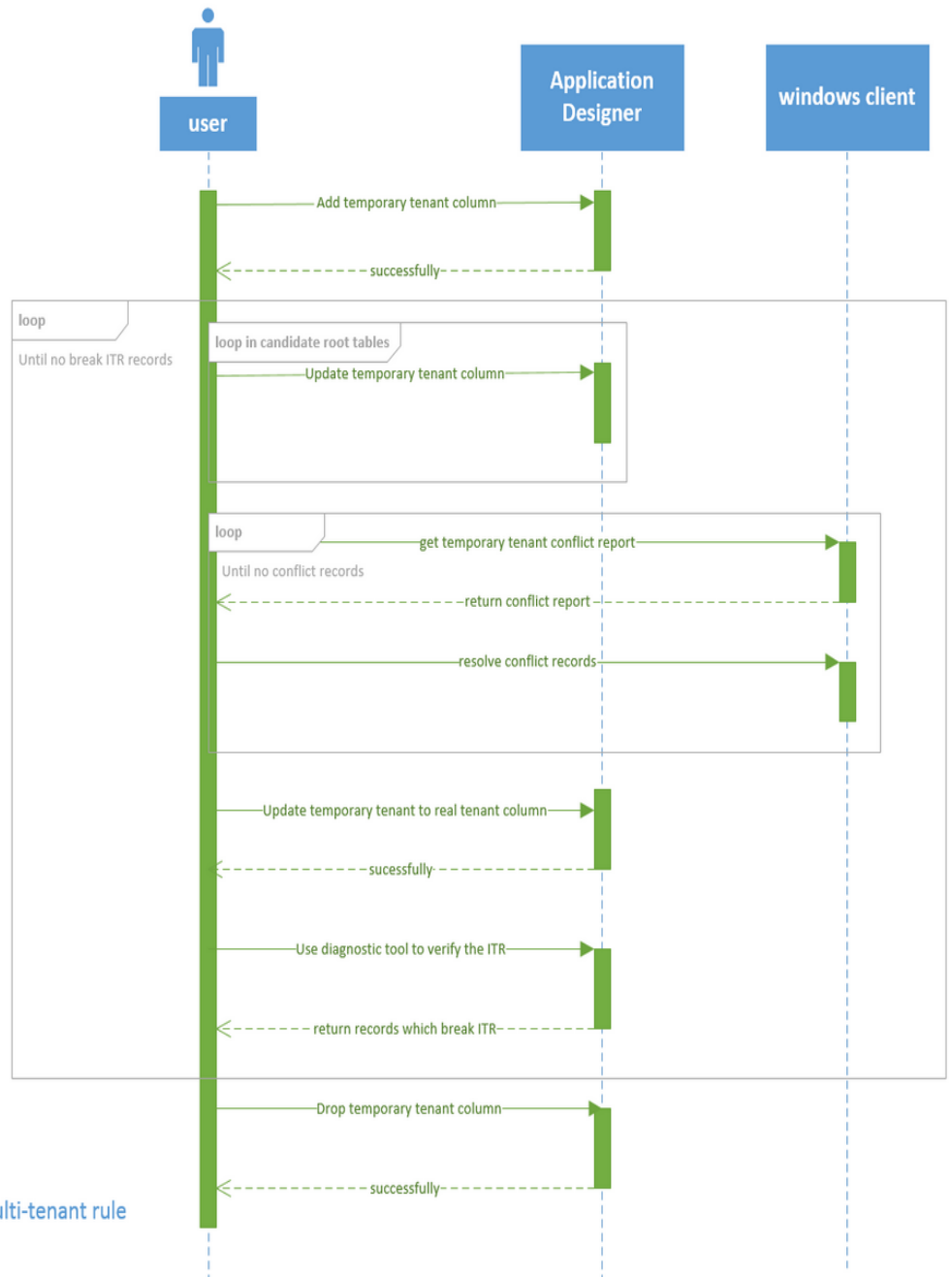
Overview of the advanced solution

The advanced solution consists of the following steps.

Step 1. Add a temporary tenant column

This step creates a temporary tenant column in all of the multi-tenancy tables. This column stores the tenant information of the data to be moved in later steps.

This step also creates a page in every screen of the multi-tenancy tables. This page only contains the temporary tenant column.

Step 2. Update the temporary column

This step updates the temporary column with the name of the target tenant. The value of the temporary column is updated based on the condition you select in the **Update Temporary Tenant** window. However, it is possible that a record is moved to more than one tenant, the value of the temporary column will contain the names of all these target tenants, separated by a "|" character. The records of this kind are called "conflict records".

Step 3. Resolve temporary tenant conflicts

This step provides you with a script to create a wizard, which shows a list of the tables that contain the "conflict records" and the number of the "conflict records".

You can select a table from the list and go to the screen of the table. The screen shows all the "conflict records" in the table, you can manually correct the value of the temporary column.

Step 4. Update the temporary tenant to the real tenant column

Run this step to synchronize the value of the real tenant column with the temporary tenant column. If there is still a conflict or the tenant name does not exist, the incorrect value will not be synchronized.

Step 5. Use the diagnostic tool to verify the integrity of tenants

This step invokes the diagnostic tool to detect the data that breaks the integrity of the multi-tenancy rule. This kind of data exists because you missed them in step 2. Therefore, you must start over from step 2 to eliminate these kind of data.

Step 6. Drop the temporary tenant column

This step discards the temporary tenant column/page created in step 1.

Step 1. Add a temporary tenant column

To add a temporary tenant colum, follow these steps.

    A. Start Asset Manager Application Designer.
    B. Connect to the database.
    C. Select the **Action/move data across tenants** menu.

D. In the **Specify record(s) to be moved** window, click **Advanced Solution**.
E. In the **Advanced Solution** window, click **Add temporary tenant column**.
F. Click **Next**.

Notes:

- This step will add a column named "TT" with index and a page named "pgTT" for each multi-tenant table, the page "pgTT" will be added in every screen of the multi-tenant table.
- This step should be done at the very beginning. You only need to do this step for the first time.

Step 2. Update the temporary tenant column

To update the temporary tenant column, follow these steps.

A. Start Asset Manager Application Designer.
B. Connect to the database.
C. Select the **Action/move data across tenants** menu.
D. In the **Specify record(s) to be moved** window, click **Advanced Solution**.
E. In the **Advanced Solution** window, click **Update temporary tenant column**.
F. Click **Next**. The **Update Temporary Tenant** window pops up.
G. Click **Open**, select the template file, and then open it to load the template from the file.
   Note: This step is optional.
H. Select **Source tenant**.
I. Select **Target tenant**.
J. Select the root table and the link hierarchy associated with the root table.
   a) Select the root table from table list.
   b) The links of the root table are listed automatically. The overflow link of the current table is selected by default.
   c) Manually select the links needed.
   d) If one link is selected, the links of the target table will be shown.
K. Set up the filter for the root table.
L. Click **Display Selected** or **Display All**. If you click **Display Selected**, only the selected link hierarchy is displayed.
   Note: This step is optional.
M. Click **SaveAs** to save the current configuration (including source tenant, target tenant, root table, filter of root table, and link path hierarchy of the root table) for further use. For example, you want to start over the process, the saved the configuration can be used as a template.
   Note: This step is optional.
N. Click **Start**.

Notes:

- Root table is the table which you select from the drop-down table list.
- This step is the core function of this solution, you can do it several times based on different root tables.

- *The records that are already in the target temporary tenant will not be updated again, which means the records' TT column already contains the target tenant information.*

Step 3. Resolve temporary tenant conflicts

To resolve temporary tenant conflicts, follow these steps.

A. Start Asset Manager Windows client.
B. Connect to the database.
C. Select **Tools/Actions/Edit**.
D. Create a new wizard named **AnalyseConflicts**. For example, copy and paste the following script.

```
Name = "Wizard"
Version = "11076"
{ Page Page1
  { ListBox list
    ColTitle = "table|conflicts"
    ColWidth = "50|50"
    Value = ""
    { Values =
      Dim lngTableCount as long
      Dim intTableCounter As integer
      Dim hTableHandle as long
      Dim strTableSqlName as string
      Dim strTableList as String
      Dim strItem as String
      Dim strSql as String
      Dim strCount as String

      AmSetVisibleTenants(3)
      lngTableCount = amGetTableCount()
      lngTableCount = lngTableCount - 1
      For intTableCounter=0 to lngTableCount Step 1
        hTableHandle = amGetTable(intTableCounter)
        strTableSqlName = amGetTableSqlName(hTableHandle)
        if (AmIsMultiTenant(strTableSqlName )) then
          strSql = "select count(*) from " & strTableSqlName & " where TT like '%|%'"
          strCount = AmDbGetLong(strSql)
          if strCount <> "0" then
            strItem=strTableSqlName & "|" & strCount &"="& strTableSqlName
            strTableList = strItem  &","& strTableList
          end if
        end if
```

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```
        Next

        RetVal=strTableList

      }

    }

  }


  { Finish Finish

    { Do =

        Dim strTable As String

        Dim lErr As Long

        strTable = {Page1.list.Value}
        if strTable <> "" then
          lErr = AmOpenScreen(strTable,"","TT like '%|%'","","")

        end if

    }

  }
```

E. Run the script, it will list the tables which have conflicts and the number of conflict items.
F. Select a table.
G. Click **OK**.
H. The screen of the selected table is opened with only the conflict items.
I. Modify the TT field with the tenant information for each item. For example, the old value is 'HP|Intel', if you change it to 'HP', this item will be assigned to the HP tenant later. Notice that you need to correct the conflicts manually. For example, you can duplicate the conflict record peer-to-peer with all the tenants in the TT column. Or, you can modify the conflict record to the shared data. You can also use other methods according to the business behavior.
J. Repeat step A to step I until no conflict tables exist anymore.

Notes:

• This wizard lists the tables which have conflicts in the TT column, the conflicts mean that the TT column contains the information of more than one tenant. If no item is shown in the list of this wizard, there is no record being split into more than one tenant in your database.
• The conflicts of the items only cover the record set which you updated in step 2, it depends on the link hierarchy which you selected for each root table. The links that you did not select is out of this scope.

Step 4. Update the temporary tenant to the real tenant column

To update the temporary tenant to the real tenant column, follow these steps.

A. Start Asset Manager Application Designer.
B. Connect to the database.
C. Select the **Action/move data across tenants** menu.
D. In the **Specify record(s) to be moved** window, click **Advanced Option**.

E. In the **Advanced Solution** window, Click **Update temporary tenant to real tenant column**.

F. Click **Next**.

Notes:

- This step will move your data to the tenants, it may take some time to finish.
- *It will not touch the items which have conflicts in TT column. This kind of items can be detected in step 5.*

Step 5. Use the diagnostic tool to verify the integrity of tenants

To verify the integrity of the tenants, follow these steps.

A. Start Asset Manager Application Designer.
B. Connect to the database.
C. Select the **Action/ Diagnostics / Repair database** menu.
D. In the **Database diagnostics** window, select the **Multi-tenancy diagnostics** task.
E. Click **Run**.

Notes:

- This step may take some time to complete.

- The multi-tenancy diagnostic tool only performs multi-tenancy diagnoses. It will not repair the database to solve the problems found regardless of whether you select the **Repair** option or not.

- A detailed message is displayed indicating the records violating the multi-tenancy integrity rules.

- This kind of records violates integrity of the multi-tenancy rule, they exist because some data were assigned to another tenant in previous steps, these records should be assigned into the same tenant as well, but the user missed them in previous steps.

- Start over from **Step 2. Update the temporary tenant column** to fix the problem.

Step 6. Drop the temporary tenant column

After you have done all the previous steps, follow these steps to drop the temporary tenant columns and pages.

A. Start Asset Manager Application Designer.
B. Connect to the database.
C. Select the **Action/move data across tenants** menu
D. In the **Specify record(s) to be moved** window, click **Advanced Solution**.
E. In the **Advanced Solution** window, click **Drop temporary tenant column**.
F. Click **Next**.

Reset temporary tenant column value of all tables (optional)

To reset the value for temporary tenant column, follow these steps.

A. Start Asset Manager Application Designer.
B. Connect to the database.
C. Select the **Action/move data across tenants** menu.
D. In the **Specify record(s) to be moved** window, click **Advanced Solution.**
E. In the **Advanced Solution** window, click **Reset temporary tenant column value of all tables**.
F. Click **Next**.

Note:

This function is only used when you make some mistakes in the process of updating the temporary tenant column. This function resets the value of all the TT columns to Null.

More information

For more information, please visit the HP Management Software support website:

https://softwaresupport.hp.com

This website provides contact information and details about the products, services, and support that HP Management Software offers.

HP Management Software online software support provides customer self-solve capabilities. It provides a fast and efficient way to access interactive technical support tools needed to manage your business. As a valued customer, you can benefit by being able to:

• Search for knowledge documents of interest
• Submit and track progress on support cases
• Submit enhancement requests online
• Download software patches
• Manage a support contract
• Look up HP support contacts
• Review information about available services
• Enter discussions with other software customers
• Research and register for software training

Note:
Most of the support areas require that you register as an HP Passport user and sign in. Many also require an active support contract.

To find more information about support access levels, go to the following website:

http://www.hp.com/managementsoftware/access_level

To register for an HP Passport ID, go to the following website:

http://www.managementsoftware.hp.com/passport-registration.html