

# Tech-Bulletin #1

## How to solve HMC data inconsistency problems

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## Overview

In HMC provisioning system, all the data are stored in Active Directory and SQL Server database. Inconsistent data between AD and SQL Server database will cause our system problems. This article explains the data relationship and provides detail procedures about how to use CROSSDS procedures to solve the inconsistency problems.

## Problems

Here is a brief introduction of the problems that our customers met. For detailed information, please refer to the scenarios section in the [requirement document](#) in our SharePoint site .

### User Object deleted through ADUC or Managed Layer API

Sometime, OrgCreators may delete their customers using ADUC. Also when DomainAdmins are doing some experiments, they may delete users/organizations using Managed layer namespaces. When a new user/organization with the same name is created, reduce the organizations' resource capacity become less and less. Finally, the UserCreators of the organization can't create mailbox, public folders and OAB. For some asset like SmtptDomain, if it's not deleted, the newly created organization can't use that SmtptDomain again.

### Exchange server moved after catastrophic hardware failure

When Exchange server that holds public folders and mailboxes experienced a catastrophic hardware failure, the DomainAdmin has no choice but to build a new server. He can create new public stores and mail stores. Then use the Exchange Database Portability feature to restore the mailboxes and public folder data. But he also has to re-map all the resource allocations from original stores to new stores.

### Deleted Mailbox is recovered by Exchange console

A user account is deleted using ADUC. Then user and mailbox with the same name is created again. The user's mailbox data is recovered through Exchange Management Console. But the user's mailbox activity is no longer shown in the EOM report.

### OAB server catastrophic hardware failure

An Exchange server that holds OABs experienced a catastrophic hardware failure. A new server is set up but the original OAB resources should be remapped to the new server.

## Data stored in AD and SQL server database

To understand how to identify and solve the problems our customers met, this section explains the data relationship stored in AD and SQL Server database that causes the data inconsistent problem.

### When create a customer

It will create an AD user/organization object. In SQL Server database, PlanManager.Customers table will store the object's GUID, parent object GUID and user/organization's UPN. If the object is a reseller, its parent object GUID is NULL. Here is an example:

CustomerID	ParentID	S...	C..	CommonName
bb08cf2a-3b25-7a47-85c2-6ef0c39888b3	f09137ed-17a8-7545-b4eb-94d8a042e...	EN	BU	user1@TestOrg
83bd20bc-1f9f-3443-b2f5-8174068e6d7f	NULL	EN	RO	ConsolidatedMessenger
f09137ed-17a8-7545-b4eb-94d8a042ea30	83bd20bc-1f9f-3443-b2f5-8174068e6d7f	EN	BZ	TestOrg

Figure 1 Table PlanManager.Customer

Parent order: user1@TestOrg -> TestOrg -> ConsolidateMessenger. Column CustomerID and ParentID tell this relationship.

If organization is subscribed to a plan, the PlanManager.CustomerPlans will record which plan the organization is subscribed to. Also if available plans are added to the organization, PlanManager.AvailablePlans will record which available plan the organization has.

### When add Exchange resources

There are four types of Exchange resources: business mail stores, consumer mail stores, public folder stores, and OAB stores. Both business mail stores and consumer mail stores are just mail stores of Exchange server. All of the four types of Exchange resources are AD objects. Here is an AD example:

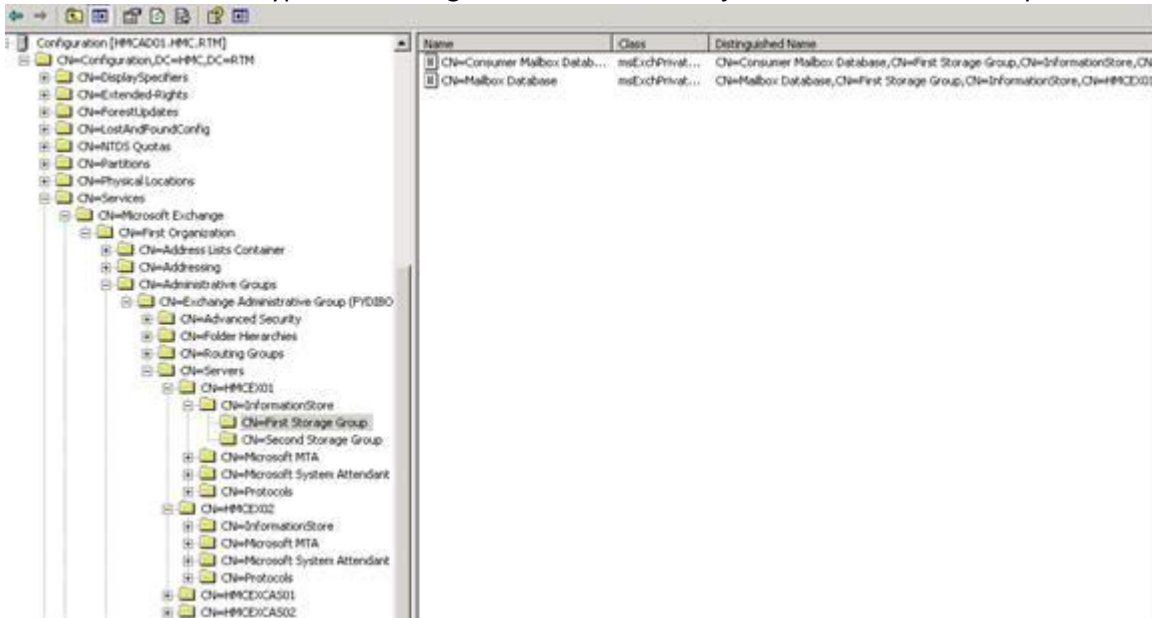


Figure 2. Exchange resources stored in AD

When you add these resources, our provisioning system will add records in the tables ResourceManager.rmcore\_ResourceInstance and ResourceManager.blockmodel\_ResourceCapacity. Table ResourceManager.rmcore\_ResourceInstance stores all the resources. Table ResourceManager.blockmodel\_ResourceCapacity stores the storage information. Here is one example:

instance_id	instance_name	instance_description	type_jd	instance_location	instance_prov
418a10f9-aaf0-...	5295EE4CC11A...	Exchange OAB Public Folder ...	e9cc5fb9-52d4-...	HMCEX02	True
8d5b9c6a-e603-...	D8C2A833E5D7...	Exchange OAB Public Folder ...	e9cc5fb9-52d4-...	HMCEX01	True
be5210d1-61c0-...	0CA38DEDEF4A...	Mailbox Database	a92f72e8-2706-...	HMCEX02	True
eba791b0-fa44-...	160B37146CE2D...	Consumer Mailbox Database	629056c8-af01-...	HMCEX02	True
9d13b59a-1d70-...	4D5C1164FEB06...	Consumer Mailbox Database	629056c8-af01-...	HMCEX01	True
3f825c40-2024-...	D8C2A833E5D7...	Exchange Public Folder Store	a6874cdb-eda3-...	HMCEX01	True
6c6abd40-af71-...	A186D8ED577E...	Mailbox Database	a92f72e8-2706-...	HMCEX01	True
74c317db-5e2a-...	5295EE4CC11A...	Exchange Public Folder Store	a6874cdb-eda3-...	HMCEX02	True
483b0184-1a3c-...	F67B4A21228C1...	Mailbox Database2	a92f72e8-2706-...	HMCEX01	True
0b6-e0bfa1a614d6	12F1D052EAA1...	Ex2007RM Consumer Mailbo...	a92f72e8-2706-...	HMCEX02	True

Figure 3. Table ResourceManager.rmcore\_ResourceInstance

Note that in Figure3, the instance\_name is the Exchange resource AD object GUID. Instance\_location is the Exchange server name. The column instance\_description is the mail store or public folder store's common name in AD.

instance_id	actual_max	virtual_max	actual_free	virtual_free	warning_pc	max_fill_pc	fill_ratio
418a10f9-aaf0-4707-87ab-26...	30000	1	30000	1	80	100	0
8d5b9c6a-e603-45d1-988b-2...	20000	1	20000	1	80	100	0
61c0-439d-8ae7-2a07534de13c	3000000	3	3000000	0	80	100	0
eba791b0-fa44-402f-aaac-6f...	1024000000	0	1024000000	0	90	95	0
9d13b59a-1d70-4793-b2c1-9...	1024000000	0	1024000000	0	90	95	0
3f825c40-2024-422c-9a77-9d...	5000000	1	5000000	1	80	100	0
6c6abd40-af71-45c8-926a-b5...	3000000	3	3000000	0	80	100	0
74c317db-5e2a-4a12-a9b8-b...	4000000	1	3999990	1	80	100	0
483b0184-1a3c-44bf-a784-d8...	3000000	2	3000000	1	80	100	0
dc29e91e-2639-4e13-80b6-e...	3000000	3	3000000	0	80	100	0
dbc1cd72-f234-4eec-9628-f0...	10	0	10	0	80	100	0

Figure 4 Table ResourceManager.blockmodel\_ResourceCapacity

### When allocate mail/public store for organization

When you create a Hosted Email 2007 organization plan, you can define whether a plan contains the feature of mail store and public folder store. If you defined, after you subscribe the plan to an organization, our provisioning system will insert records into table ResourceManager.rmcore\_ConsumerInstance, ResourceManager.rmcore\_ResourceInstance, ResourceManager.blockmodel\_ModelAllocationData, and ResourceManager.blockmodel\_ResourceCapacity. Here is an example:

instance_name	instance_description	t...	instance_location	insta
5295EE4CC11A0643ADC8A37CA587151C	Exchange Public Folder Store	a...	HMCEX02	True
D8C2A833E5D77547862788C140EBE544	Exchange Public Folder Store	a...	HMCEX01	True
A186D8ED577E1A41BF770EE172160926	Mailbox Database	a...	HMCEX01	True
F09137ED17A87545B4EB94D8A042EA30	mail storage space owned by an organization	5...	A186D8ED577E1A41BF770EE172160926	True
F09137ED17A87545B4EB94D8A042EA30	public storage spaced owned by an organization	6...	5295EE4CC11A0643ADC8A37CA587151C	True

Figure 5

Table ResourceManager.rmcore\_ResourceInstance

instance_id	instance_name	instance_description
4f3b51d0-dd5...	ExchShareHog	Consumes all of the virtual capacity for shared mail stores
0ee97032-efd...	F09137ED17A87545B4EB94D8A042EA30	Original path:LDAP://OU=TestOrg,OU=ConsolidatedMesser

Figure 6 Table ResourceManager.rmcore\_ConsumerInstance

Instance\_name in both tables is the organization AD objects GUID. The instance\_location of record 1 and 2 in figure 5 is the mail store and public store's AD object GUID.

### When create mailbox

Business mailboxes will consume space from an organization's mail store. Here is an example of a mailbox.

instance_id	instance_name	instance_description
c-032263920161	ExchShareHog	Consumes all of the virtual capacity for shared mail st
b9318a1c-8c4f-479d-ac6c-99ecec4e5ae4	B808CF2A38257A4785C26EF0C39888B3	mailbox
0ee97032-efde-432b-b386-b115840c2856	F09137ED17A87545B4EB94D8A042EA30	Original path:LDAP://OU=TestOrg,OU=Cor

Figure 7 Table ResourceManager.rmcore\_ConsumerInstance

The instance\_name is the user object GUID in AD.

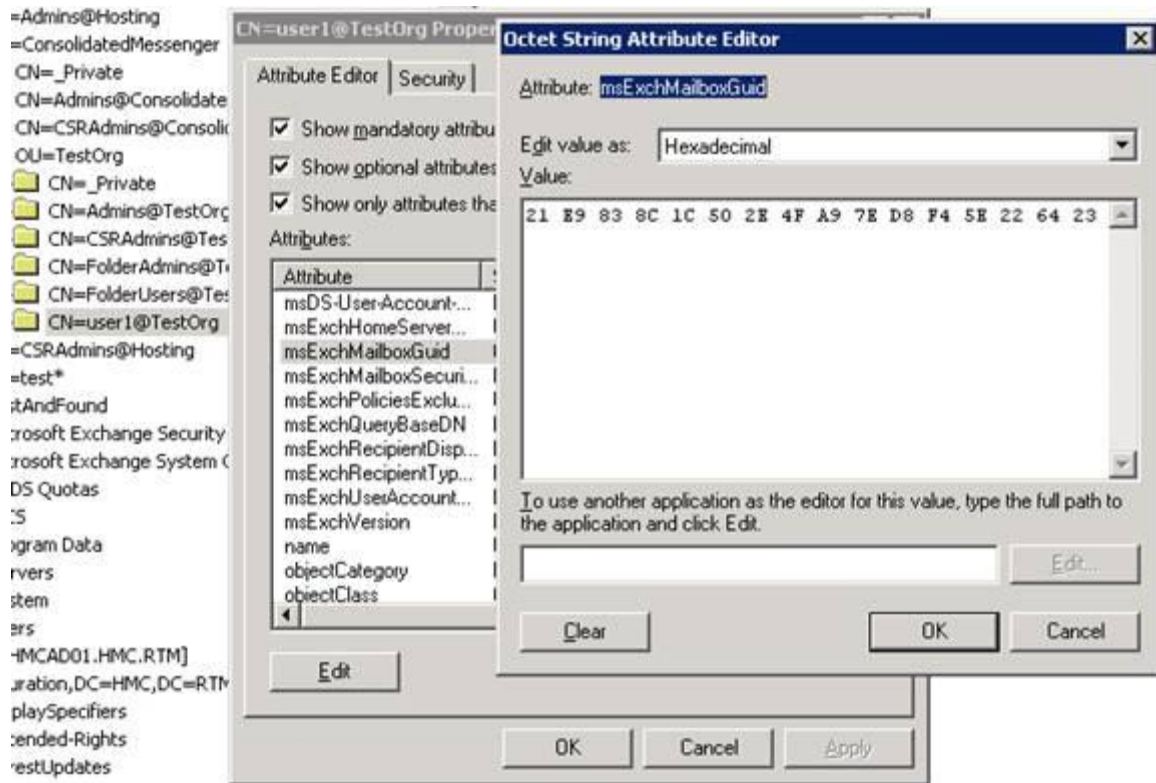


Figure 8 Mailbox GUID property

There will be a mailbox GUID property value will set to the user object in AD. Then mailbox GUID is the user's asset and will be stored in the PlanManager.CustomerAssets table.

CustomerID	AssetId	Asset	AssetTypeCode
bb08cf2a-3b...	5f603c7b-be...	21E9838C1C502E4FA97ED8F45E226423	EG

Figure 9 Table PlanManager.CustomerAssets

resource_id	consumer_id	actual_used	virtual_used
87f5881d-8499-43e2-98c3-065e03bb57b0	0ee97032-efde-432b-b386-b115840c2856	2000	0
ffdaa063-f20f-4e07-b8d6-6e61c460e24f	4f3b51d0-dd54-4907-ac3c-032263920161	0	3
ffdaa063-f20f-4e07-b8d6-6e61c460e24f	0ee97032-efde-432b-b386-b115840c2856	3000	0
51970f7a-1430-4fb1-8f64-9286f162457e	b9318a1c-8c4f-479d-ac6c-99ecec4e5ae4	98	0

Figure 10 Table ResourceManager.blockmodel\_ModelAllocationData

Notice the value of blockmodel\_ModelAllocationData .consumer\_id comes from rmcore\_ConsumerInstance .instance\_id. It records how much space the mailbox used.

### When create public folder

After a folder is created, the folder would consume the organization's public folder store space. The instance\_name is the organization's GUID plus the folder name.

instance_id	instance_name	instance_description
4f3b51d0-dd54-4907-a...	ExchShareHog	Consumes all of the virtual capacity for shared mail stores
b9318a1c-8c4f-479...	BB08CF2A3B257A4785C26EF0C39688B3	mailbox
0ee97032-efde-432...	F09137ED17A87545B4EB94D6A042EA30	Original path:LDAP://OU=TestOrg,OU=Consolida
66e24d07-f2b9-4d8...	F09137ED17A87545B4EB94D6A042EA30\AlpineSkiHouse	public folder

Figure 11 Public folder instance name in table rmcore\_ConsumerInstance

Table ResourceManager.blockmodel\_ModelAllocationData also records how many space the public folder used.

### When create SMTP domain

After create SMTP domain, in the PlanManager.CustomerAssets, it stores the domain's name. Here is an example:

CustomerID	AssetId	Asset	AssetTypeCode	StatusTypeCode
F09137ed-17...	371209a1-c...	TestOrg.com	SD	EN

Figure 12 Customer SMTP domain assets

## When add OAB server resource and allocate OAB for organization

After add an OAB server, in table ResourceManager. rmcore\_ResourceInstance, instance\_name and instance\_location is just the public folder store's instance name. The instance\_description is always "Exchange OAB Public Folder Store".

instance_id	instance_name	instance_description	instance_local
246817da-6c0d-4c66-b244-077e36b18672	D8C2A833E5D77547B62788C140EBE544	Exchange OAB Public Folder Store	e_hmcEX01
ef017ef2-4493-43f8-be9b-6271c627984c	D8C2A833E5D77547B62788C140EBE544	Exchange Public Folder Store	a_HMCEX01

Figure 13 an OAB server resource

If you allocate a OAB resource for an organization, rmcore\_ConsumerInstance table and blockmodel\_ModelAllocationData record which organization consume the OAB resource. Please take a look at figure13 to figure 15. Notice the highlight part, it connect the consumer and resource.

instance_id	instance_name	instance_description
32ccbbb7-4384-4d15-b685-6fbfea7485b1	F09137ED17A87545B4EB94D8A042EA30	Original path:LDAP://OU=TestOrg,OU=ConsolidatedMe

Figure 14 OAB consumer

resource_id	consumer_id	actual_used	virtual_used	fill_ratio
246817da-6c0d-4c66-b244-077e36b18672	32ccbbb7-4384-4d15-b685-6fbfea7485b1	1	0	0

Figure 15 Allocation data

## How to solve the problems using CROSSDS procedures

If an object can't be found but its related data is still in the provisioning system database, we say it is an orphaned object. Any data related with the object is orphaned data. The basic idea is to update some procedures to accept object's GUID as identity and add some new procedures delete the orphaned data using the GUID identity. This section tells you how to use those procedures. Detail implementation information won't be covered.

### User Object deleted through ADUC or Managed Layer API

In some query procedure's, it will return the object's LDAP path in AD. If the object is deleted in AD, we can't get the LDAP path anymore. The empty LDAP path indicates that the object is an orphaned object. Here are the steps that we can use to solve the problem:

1. Use Managed Plans::QueryCustomersByParentID to indentify the orphaned organization. We will get an orphaned organization GUID list. For each orphaned organization, we do the following 2-4 steps.
2. Use Managed Plans::GetServicesByCustomer to get what services the organization is subscribed to. This is an updated procedure. It accepts an organization's GUID.
3. If the organization is subscribed to email service, we can use Exchange 2007 Resource Manager::QueryConsumersByOrganization to get all the mailboxes and public folder information. Hosted Email 2007::DeallocateMailboxByGUID can help to delete a mailbox using user GUID. Hosted Email 2007::DeleteFolderByGUID can help to delete the organization public folder using organization GUID. Exchange 2007 OAB Resource Manager::DeallocateOAB can help to delete the OAB consumers using organization GUID.
4. Then we need to call each hosted layer's UnSubscribe procedure to unsubscribe all the services. The Unsubscribe procedures are updated to accept organization's GUID. Basically, this procedure will remove the customer plans, available plans. For Hosted Email 2007, this procedure will recycle

the mail/public store space and delete the SMTP domain asset. All the related procedures are updated to accept the organization GUID as identity.

5. For each organization, we use Managed Plans::GetCustomerByParentID to get all the orphaned users. Then use procedure Managed Plans::DeleteCustomerByGUID to delete the users that under this organization. This procedure will also help to delete plans, available plans and assets belong to the users. Finally, we call this procedure again to delete the organization if the organization is orphaned.

### **Exchange server moved after catastrophic hardware failure**

All we need to do is to modify the instance\_name, instance\_location and instance\_description. Exchange 2007 Resource Manager::ModifyStoreByGUID can help us to do it. You just need to input the old instance\_name, new instance\_name, new instance\_location and new instance\_description. These information will be updated. And all organization ExchOwningOrgPublicResource07/ExchOwningOrgMailResource07 resource type instances' instance\_location value will be updated.

### **Deleted Mailbox is recovered by Exchange console**

Exchange provides a useful function that can help to recover a user account's mailbox. If you delete a user in AD, you need to create the same user. Then using the "Connect-mailbox" to recover the mailbox's old mails. However, after doing that, the user's mailbox GUID will be changed. We need update the customer asset table. If not, our M&R can't report whether an organization's user is using mail service. Hosted Email 2007::ResyncMailboxGUID can help us to correct the user's mailbox GUID asset.

### **OAB server catastrophic hardware failure**

The procedures are the same with those in section 2. The OAB server's instance\_name, instance\_location need to be updated. Exchange 2007 OAB Resource Manager::ModifyStoreByGUID can help to do that.

### **Limitations**

Currently, we don't provide administrator tools to help our customer detect the data inconsistency problem. Also we do not automatically solve the data inconsistency problem. All we do is just providing APIs to help customer delete the orphaned data.

For SharePoint, we have no procedures to help our customer delete the sites after a user is deleted in AD using ADUC or Managed Layer procedure. This is because that the customer site information is stored AD. If the organization is deleted, we can't know what sites the organization has. However, we can still use the SharePoint Central Administration tools to delete the sites (Central Administration > Application Management > Delete Site Collection), because we can still find the site in the site collection. Here is an example data stored in AD after creating a site:

The image shows the ADSI Edit interface for a domain named [HMCAD01.HMC.RTM]. The left pane displays a tree view of the directory structure, with the following path highlighted: DC=HMC,DC=RTM > OU=Hosting > OU=ConsolidatedMessenger > OU=AlpineskiHouse > CN=SharePointSites > CN=SharepointSite2. The right pane shows a table of properties for the selected object.

Name	Class
CN=siteGUID	contact
CN=siteType	contact
CN=subSiteGUID	contact
CN=target	contact

Figure 16 SharePoint site information in AD

For other data such as mobility active sync mailbox policies, address lists, etc, we don't store the information in our provisioning database. If the user object is deleted, we don't know what data the user consumes. So our customers have to delete those objects using Managed Layer APIs or using Exchange console management tool.

For Office Communication Services, our dev is updating the Unsubscribe procedure to accept organization GUID to solve the data inconsistency problem.