



ARC HYDRO TOOLS CONFIGURATION DOCUMENT #1

HYDROID AND UNIQUEID MANAGER CONFIGURATION



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HydroID and UniqueID Manager Configuration

Arc Hydro Tools Configuration Document #1

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Contents

- 1.0 Introduction 1
- 2.0 HydroID Description 1
 - 2.1 The Principles of HydroID Assignment 1
 - 2.1.1 The Last Used HydroID Counter Concept 2
 - 2.1.2 Access to LAYERKEYTABLE and APUNIQUEID..... 2
 - 2.2 HydroID generation..... 3
 - 2.2.1 Automated HydroID Generation 3
 - 2.2.2 Manual HydroID Generation..... 4
 - 2.3 Setting Up the HydroID Counter..... 4
 - 2.3.1 Planning and Executing the HydroID Setup 5
 - 2.4 HydroID Implementation Issues 5
 - 2.5 Globalizing HydroID 6
 - 2.5.1 ADO Connection 6
 - 2.6 Creative HydroID “Seeding” 6
 - 2.6.1 Single Project Processing..... 7
- 3.0 UniqueID Manager Setup 8
 - 3.1 Installation and Registration..... 8
 - 3.2 Configuration file.....10
 - 3.2.1 Tables Definition 11
 - 3.2.2 UniqueIDs Definition..... 11
 - 3.2.3 Workspace vs. ADO Connection 12
 - 3.3 Tables Setup 13
 - 3.3.1 Tables Design 13
 - 3.3.2 Populating the tables 13
 - 3.4 Configuring a new UniqueID..... 14
- 4.0 Appendix – Configuring an Oracle Net Service Name 16

List of Figures

Figure 2-1– Relationship between LAYERKEYTABLE and APUNIQUEID tables	2
Figure 2-2 – Initial LAYERKEYTABLE and APUNIQUEID table setup	4
Figure 2-3 – Example of LAYERKEYTABLE and APUNIQUEID table setup	5
Figure 3-1– UniqueID Manager Installation Location	9
Figure 3-2 – ApUniqueIDConfig.xml Configuration File.....	11
Figure 3-3 – ApFramework.ini configuration file	Error! Bookmark not defined.
Figure 3-4 – Populated APUNIQUEID table	14
Figure 3-5 – Populated LAYERKEYTABLE	14
Figure 3-6 – New UniqueID in APUNIQUEID	15
Figure 4-1 - Net Configuration Assistant Location	16
Figure 4-2 -- Net Configuration Welcome Window	17
Figure 4-3 – Net Configuration Add Window.....	17
Figure 4-4 – Net Configuration Service Name Window	18
Figure 4-5 – Net Configuration Protocol Window.....	18
Figure 4-6 – Net Configuration Protocol Settings Window	19
Figure 4-7 – Net Configuration Connection Test Window	19
Figure 4-8 – Net Configuration Net Service Name Window	20

HydroID and UniqueID Manager

1.0 Introduction

By definition, HydroID is a unique identifier for features within a single geodatabase that conform to the Arc Hydro data model. Each feature, regardless of the feature class it belongs to has a unique HydroID (unlike the ObjectID that is unique within a feature class, but not unique within a geodatabase). HydroID is defined as a long integer (valid range between +/- 2,147,483,648, although only positive values should be used).

HydroID is used in key relationships in the Arc Hydro data model. “DrainID”, “JunctionID”, “NextDownID”, “FeatureID”, “FromNodeID”, and “ToNodeID” attributes all contain the HydroID of relevant feature class. All established relationship classes within Arc Hydro use that, and it can also be the basis of establishing additional relationships (either through a relationship class or programmatically).

Arc Hydro tools manage the HydroID directly, that is, the tools will populate the HydroID automatically for any new feature (member of a feature class that follows the Arc Hydro data model) that is created through the tools. The tools also manage the related attributes that contain the HydroID. For example, when generating the hydro network using the “Hydro Network Generation” tool, the “JunctionID” field in the “DrainagePoint” feature class will be correctly populated with the HydroID of the hydro junction associated to the DrainagePoint point. Several other functions maintain such relationships programmatically.

The HydroID management is performed by a unique ID manager that is installed with the Water Utilities Framework (i.e. ApFramework). This manager may also be used to manage unique ids outside of Arc Hydro.

2.0 HydroID Description

2.1 The Principles of HydroID Assignment

The implementation of HydroID assignment is based on two key premises:

- Simple implementation for a general user who does not want to micromanage the HydroIDs between the feature classes. The end user does not have to do anything – every feature in a geodatabase will have a unique number, starting with 1 and incrementing by 1 for every new feature generated in any Arc Hydro compliant feature class.

- Complex implementation for a user who wants control over HydroIDs in each feature class. The user has the ability to specify a starting point for assignment of HydroIDs for each feature class. For example, the user can specify that the HydroIDs for a catchment feature class will start at number 100,000, for the drainage line feature class will start at number 200,000, and for the hydro junction and hydro edges feature classes will start at 300,000.

2.1.1 The Last Used HydroID Counter Concept

The HydroID for a new feature is obtained from a “last used HydroID” counter. This counter (LASTID) contains the last HydroID that was assigned to a new feature. When requested, this counter is incremented by one, and the HydroID number is passed on to the function that assigns it to the newly created feature.

To provide the flexibility where each feature class can have an independent counter, the counter concept is implemented through two related tables. The first table (LAYERKEYTABLE) contains the relationship between the feature class name and the last used HydroID key, while the second table (APUNIQUEID) contains the relationship between the last used HydroID key and the counter itself.

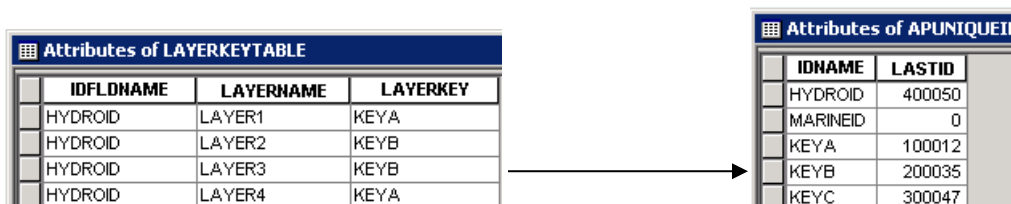


Figure 2-1– Relationship between LAYERKEYTABLE and APUNIQUEID tables

For example, in Figure 2.1, the field HYDROID in the layer “LAYER3” points to LAYERKEY “KEYB” in LAYERKEYTABLE and “KEYB” in the field IDNAME in APUNIQUEID is associated to the LASTID “200035”. When a new feature in LAYER3 is created, it will be populated with HydroID 200,036 and the LASTID value for KEYB will be incremented to 200,036. Also note that in LAYERKEYTABLE, LAYER2 is also pointing to KEYB. This means that all the new features in LAYER2 will be drawing from the same pool of HydroIDs as the new features in the LAYER3 feature class.

If a feature class name is not specified in the LAYERNAME field of the LAYERKEYTABLE then the HydroID will be drawn from the HYDROID record in the APUNIQUEID table (e.g. 400,050 in figure 2.1).

2.1.2 Access to LAYERKEYTABLE and APUNIQUEID

Arc Hydro tools can access the LAYERKEYTABLE and APUNIQUEID tables in two ways. The first way is through the geodatabase’s workspace; the second is through an ADO connection. Depending on the way used to access to the two tables, the LAYERKEYTABLE and

APUNIQUEID tables exist either in the geodatabase (workspace access) or in an external database management system (ADO access).

When the two tables are in an external database (ADO connection) they can serve HydroIDs to several geodatabases and make HydroID globally unique for all the databases retrieving the HydroIDs from the same set of LAYERKEYTABLE and APUNIQUEID tables.

With workspace access, the two tables are automatically generated for each geodatabase. For ADO connection, the two tables need to be set by the user in any supported RDBMS. The ADO connection needs also to be set by the user (Details on setting up the workspace and ADO access for HydroID generation are described in Section 3).

2.2 HydroID generation

There are two processes available to generate HydroIDs:

- Automated process: HydroIDs are generated either by using the Arc Hydro tools that create new features in Arc Hydro compliant feature classes, or by using the standard ArcMap editing process and adding new features.
- Manual process: HydroIDs may be generated by using the functions “Attribute Tools > Assign HydroID” or “ApUtilities > Assign UniqueID” in the Arc Hydro Tools toolbar or in the Arc Hydro Tools toolbox > Attribute Tools > ID Management toolset.

It is also possible to combine the two processes if necessary.

2.2.1 Automated HydroID Generation

HydroIDs will be generated (and placed in related ID fields such as DrainID, NextDownID, JunctionID, etc.) automatically by any of the Arc Hydro tools that generate new features in any of the Arc Hydro feature classes. The HydroIDs will also be assigned to any new feature belonging to an Arc Hydro feature class (actually any feature class that has HydroID attribute in it) generated through standard editing process (create new feature) in ArcMap.

The generation of HydroID during the standard editing process requires that the “ApUniqueIDMgrExt” ESRI Editor extension be installed and properly registered. The registration is automatically performed when installing the Water Utilities Framework (i.e. ApFramework). Refer to section 3.1 – Installation and Registration for details on how to manually setup the “ApUniqueIDMgrExt”.

When adding Arc Hydro features through the editor, only the HydroIDs will be assigned to the new feature. None of the related ID attributes will be populated automatically, since the relationship between the new feature and any other feature that might contain the related ID cannot be automatically discerned. The user will have to populate those relationships manually (if necessary).

The function ApUtilities > Enable/Disable UniqueID Manager allows turning on/off the UniqueID Manager.

2.2.2 Manual HydroID Generation

The “Assign HydroID” and “Assign UniqueID” functions allow explicit assignment of respectively HydroID and other UniqueID values to a selected set of features. In general, this method should be only used to populate HydroIDs for those features and feature classes that are being imported into an Arc Hydro project. None of the related ID attributes will be populated automatically. The HydroIDs for imported features should be assigned as soon as they are added to the project and then their allocation should be done automatically.

For an Arc Hydro project, only the “Arc Hydro” HydroID Method should be used.

2.3 Setting Up the HydroID Counter

When a new geodatabase using the Arc Hydro tools is saved for the first time, the LAYERKEYTABLE and APUNIQUEID tables are automatically created. These tables will also be created in existing geodatabases if they do not already exist.

If the existing geodatabase was created with an earlier version of Arc Hydro using the HydroIDTable/LayerKeyTable as UniqueID tables, the new UniqueID tables will be created and populated with values read from the old tables to ensure consistency.

Warning

This migration will not occur for UniqueID tables accessed through an ADO connection. In this case, you will need to manually create and populate the new tables to ensure consistency.

By default, the LAYERKEYTABLE table will have no entries, while the APUNIQUEID table will have 2 records, one defining the HYDROID counter and the other the MARINEID counter. MARINEID is added as an example of how additional unique identifiers may be setup. It is not used by the Arc Hydro tools. In this (default) setup, all new features will draw the HydroID from the same source – the LASTID associated to the IDNAME HYDROID in the APUNIQUEID table. With this setting, the first available HydroID is 1.

OBJECTID	IDNAME	LASTID
1	HYDROID	0
2	MARINEID	0

OBJECTID	IDFLDNAME	LAYERNAME	LAYERKEY
(AutoNumber)			1

Figure 2-2 – Initial LAYERKEYTABLE and APUNIQUEID table setup

In order to assign a different HydroID counter to a feature class, the name of that feature class needs to be entered in the LAYERKEYTABLE in the LAYERNAME field with the IDFLDNAME set to HYDROID (i.e. the name of the UniqueID field to update). The

LAYERKEY defined for the layer in the LAYERKEYTABLE must also be defined in the APUNIQUEID table as a new IDNAME with its counter's initial value. For example, assume you want to add two layers, Catchment and DrainageLine, with Catchment's HydroID starting at 100,001 and DrainageLine HydroID starting at 200,001. The LAYERKEYTABLE and APUNIQUEID tables will look as described in Figure 2.3.

IDFLDNAME	LAYERNAME	LAYERKEY
HYDROID	Catchment	Key1
HYDROID	DrainageLine	Key2

IDNAME	LASTID
Key1	100000
Key2	200000
HYDROID	306

Figure 2-3 – Example of LAYERKEYTABLE and APUNIQUEID table setup

The LAYERKEYTABLE and APUNIQUEID tables can and should be set as soon as possible. A feature class does not have to exist in a geodatabase before a reference to it can be placed in the LAYERKEYTABLE table.

2.3.1 Planning and Executing the HydroID Setup

When the user wants to fine tune the assignment of HydroIDs, careful planning will ensure the best results. The following steps should be followed:

- Identify as early as possible all the vector feature classes that will be generated/added to the geodatabase (the ones that will have the HydroID field).
 - For each identified feature class, define the name and estimate the maximum number of features that will be stored.
- Design the numbering schema.
 - Identify which feature class will point to which key.
 - Identify starting number for each key. Make sure that the initial HydroID for each key will not be reached by HydroID for another key after all features in feature classes pointing to that key are assigned.
 - Decide whether the HydroID will be shared between different geodatabases (globally unique), and which method to use to ensure that.
 - Setup the ADO connection and tables in an external RDBMS if the ADO approach is chosen.
 - Make the numbering schema unique if workspace approach is used.
- Create the required entries in the LAYERKEYTABLE and APUNIQUEID tables as soon as possible (ideally before any feature classes are added to the geodatabase).

2.4 HydroID Implementation Issues

In principle, the implementation of HydroID generation is fairly simple and straightforward. To ensure proper implementation the following key points must be correctly implemented:

- Names of feature classes must be known in advance.
- The LAYERKEYTABLE and APUNIQUEID tables must be setup before HydroIDs can be assigned.
- The HydroID for two keys can get out of sync (pointing to the same number) if incorrect numbering schema is used (e.g. underestimating number of features to be generated).

2.5 Globalizing HydroID

In some instances, it is beneficial to have HydroID that is unique across different geodatabases (global HydroID), that is, HydroID becomes globally unique, and not only unique within a single geodatabase. There are several ways of achieving this.

2.5.1 ADO Connection

When machines that will be creating different geodatabases that need to have the same source of HydroIDs are on the same network, the simplest solution is to use the ADO approach for accessing the LAYERKEYTABLE and APUNIQUEID tables in a commonly accessible RDBMS. Once set up, the ADO connection will point to the same tables for all Arc Hydro projects.

2.6 Creative HydroID “Seeding”

If using an ADO connection is not an option (e.g. if processing will be done on machines that do not have access to a shared RDBMS), the HydroID seeds can be initiated within each geodatabase in such a way that they will be unique across all the geodatabases taken into consideration.

Consider the earlier example in which there were two feature classes - Catchment and DrainageLine, with Catchment HydroID starting at 100,001 and DrainageLine HydroID starting at 200,001. Assume that catchment analysis has to be performed at three different larger areas. Initially, each area will be processed on its own. After the initial study, the results from the three areas will be combined into a single feature class.

If the Catchment HydroID starts at 100,001 and DrainageLine HydroID starts at 200,001 for each of the geodatabases, when combining the features from the three geodatabases into a single feature class, the HydroID will not be unique in the combined feature class. To avoid this issue, the following approach can be used:

- Assign a unique reference ID for each of the three large areas, for example, 1, 2, and 3.
- Use those reference IDs to offset the HydroID counter for each feature class. For example, offset the initial HydroID for each feature class by reference ID times 10,000,001. Thus, the Catchment HydroID for area 1 would start at 10,100,001, for area 2 at 20,100,001, and for area 3 at 30,100,001. Similar adjustment can be made for DrainageLine or any other feature class.
- When assigning the starting seeds for HydroID, attention must be paid to the total number of features for all the features in all the geodatabases getting the HydroID from the same seed (to exclude the possibility of HydroID “overflow”).



- Similar approach must be taken for the HYDROID key in the APUNIQUEID table (to ensure that none of the features, for which a specific counter has not been set, will have the matching HydroIDs).

With this kind of numbering scheme, all the features in different geodatabases will have a unique HydroID and no problems will be encountered when merging the data into a single geodatabase.

2.6.1 Single Project Processing

The final strategy is to process all the data in a single project/geodatabase. If possible, all the initial data can be processed through a single geodatabase. This does not mean that the entire base data need to be in a single feature class, but rather that the processing is performed in a single project/geodatabase.

Consider the following scenario. Catchments for a large area are to be generated from DEMs and their derived grids. Due to the large size of the DEMs to cover the entire area, they have been broken down into several non-overlapping areas. These DEMs have been preprocessed and stored separately in order to manage their size. Each DEM has flow direction and flow accumulation derived grids, as well as corresponding synthetic stream and stream link grids.

At this point, it is possible to start processing the catchments in a unified manner. The following steps should be taken.

- Create a new ArcMap project and make sure the Arc Hydro toolbar is active.
- Make sure all grids have a unique name. For example, the flow direction grid for area 1 is called fdg1, while for area 2 it is called fdg2. These have to be feature class names (not entries in the legend in the ArcMap), so if renaming is necessary, it needs to be done in ArcCatalog using the rename function (right-click on the feature class to be renamed and choose “Rename”).
- Add all the required grids to the map (include grids from separate areas).
- Perform any other required grid processing (if necessary). Make sure that the grids being created have unique names (as specified in the second step).
- Save the project. After the first Arc Hydro tool operation, the LAYERKEYTABLE and APUNIQUEID tables will be created automatically if not already present. For the moment, only the HYDROID and MARINEID fields will be defined. The LASTID will be set to 0 for both. MARINEID is not used in Arc Hydro – it is shown as an example of additional UniqueID that can be managed by the UniqueID.
 - If necessary or desired, set up the HydroID numbering schema. If none is defined, all the features will share the same HydroID counter.
 - Make sure that each feature class that has HydroID field has a unique name (e.g. catchment1 for the first area, catchment2 for the second area, etc.).
- Start vector processing (where HydroIDs are generated). Since all the new features are in the same geodatabase, their HydroIDs will be unique and assigned following the HydroID schema set up in the previous step (if any was set).

3.0 UniqueID Manager Setup

The steps involved in the manual set up of the UniqueID Manager application depend on the way the two tables LAYERKEYTABLE and APUNIQUEID tables are to be accessed. These tables need to be in the same location that may be accessed in one of the two following ways:

- **Workspace connection:** the feature layers and the two tables must be stored in the same personal or ArcSDE geodatabase. The advantage is that there are no worries about connection. However, only geodatabase features can be edited (i.e. no shapefile or coverage). Moreover, the tables need to be created either manually in ArcCatalog or by using tools such as the Arc Hydro tools in ArcMap (ObjectID field is required).
- **ADO connection:** the feature layers to edit and the two UniqueID tables may be in different locations. The tables do not need to be created in ArcCatalog (no ObjectID field is needed). Geodatabase elements, shapefiles and coverages can be edited.

Only one type of connection can be used at any time for a given UniqueID – the connection type can be defined globally for all UniqueIDs being managed or individually for each UniqueID. The following sections describe the configuration and registration process.

3.1 Installation and Registration

2 dlls are needed to set up the UniqueID Manager that dispenses the Unique IDs:

- ApUniqueIDMgr.dll (ID dispenser)
- ApUniqueIDMgrExt.dll (extension to work with ArcMap Editor)

These dlls are registered with the gac during the installation of ApFramework.

Name	Date modified	Type	Size
ESRI.APWR.ApRegWork.exe	2/28/2013 9:38 AM	Application	80 KB
ESRI.APWR.ApXMLViewEdit.exe	2/28/2013 9:38 AM	Application	23 KB
PSConfigUtil.exe	2/28/2013 9:35 AM	Application	69 KB
ESRI.APWR.ApFramework.dll	2/28/2013 9:37 AM	Application extens...	385 KB
ESRI.APWR.ApUniqueIDMgr.dll	2/28/2013 9:37 AM	Application extens...	61 KB
ESRI.APWR.ApUniqueIDMgrExt.dll	2/28/2013 9:37 AM	Application extens...	70 KB
ESRI.APWR.ApUtilities.dll	2/28/2013 9:37 AM	Application extens...	194 KB

Figure 3-1– UniqueID Manager Installation Location

The 2 dlls files required by the UniqueID Manager application are Microsoft .Net files libraries that are automatically registered in the GAC during the installation of the Water Utilities Framework (i.e. ApFramework).

If needed, you can manually register these files by executing the following lines in the command window that is accessed by typing cmd in the Run window:

- %windir%\Microsoft.NET\Framework\v2.0.50727\RegAsm /u ESRI.APWR.ApUniqueIDMgr.dll
- %windir%\Microsoft.NET\Framework\v2.0.50727\RegAsm /u ESRI.APWR.ApUniqueIDMgrExt.dll

The UniqueID manager is made available as an edit event in ArcMap by registering the file ESRI.APWR.ApUniqueIDMgrExt.dll with the ESRI Editor Extensions. This registration is automatically performed when installing the Water Utilities Framework (i.e. ApFramework).

To manually register the DLL as an ArcMap extension:

- Locate categories.exe in the folder where ArcGIS is installed (e.g. ArcGIS\Desktop10.1\bin).
- Run categories.exe. The Component Category Manager opens displaying a list of categories.
- Scroll down to ESRI Editor Extensions and highlight this category by clicking it once with the left mouse button.
- Click Add Object..., and then navigate to and open ESRI.APWR.ApUniqueIDMgrExt.dll (Default location is C:\Program Files(x86)\ESRI\WaterUtils\ApFramework\bin or C:\Program Files\ESRI\WaterUtils\ApFramework\bin).
- Add ESRI.APWR.ApUniqueIDMgrExt.dll in the Add Objects windows.

ESRI.APWR.ApUniqueIDMgrExt.UniqueIDMgr is added to the list of ESRI Editor Extension.

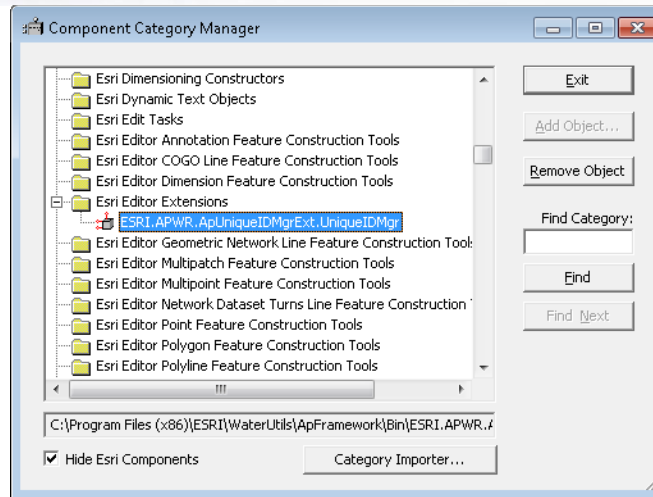


Figure 3.2 – Component Category Manager Window

3.2 Configuration file

The configuration for the UniqueID Manager is optional. If no configuration is supplied, the ApUniqueID table is used with the fields IDNAME and LASTID.

The configuration is appended during the installation of ApFramework in the ArcMap configuration file ArcMap.exe.config located in the ArcGIS installation location (e.g. C:\Program Files (x86)\ArcGIS\Desktop10.1\bin).

```
<appSettings>
  <add key="ESRI.APWR.SaveXMLInMap" value="true" />
  <add key="ESRI.APWR.DebugLevel" value="0" />
  <add key="ESRI.APWR.LogFilePath" value="C:\TEMP" />
  <add key="ESRI.APWR.LogFileName" value="AP" />
  <add key="ESRI.APWR.UNIQUEIDTABLE" value="APUNIQUEID" />
  <add key="ESRI.APWR.LAYERKEYTABLE" value="LAYERKEYTABLE" />
  <add key="ESRI.APWR.UNIQUEIDFIELD" value="LASTID" />
  <add key="ESRI.APWR.LAYERNAMEFIELD" value="LAYERNAME" />
  <add key="ESRI.APWR.LAYERKEYTFIELD" value="LAYERKEY" />
  <add key="ESRI.APWR.IDNAMEFIELD" value="IDNAME" />
  <add key="ESRI.APWR.IDFLDNAME" value="IDFLDNAME" />
  <add key="ESRI.APWR.UIDS" value="HYDROID,HYDROID|MID,MARINEID" />
  <!--
  <add key="ESRI.APWR.DBFACTORY" value="System.Data.OleDb" />
  <add key="ESRI.APWR.DBCONN"
value="Provider=Microsoft.Jet.OLEDB.4.0;Data
Source=C:\92Data\Northwind.mdb" />
  -->
</appSettings>
```

Figure 3-2 – UniqueID Manager Configuration

The configuration defines the structure of the UniqueID tables, the UniqueID configuration, and whether to use the workspace or ADO setting.

The following sections will describe the configuration file.

3.2.1 Tables Definition

The configuration file defines the following tables' parameters.

For the APUNIQUEID table

- ESRI.APWR.UNIQUEIDTABLE: Name of the UniqueID table. Default to APUNIQUEID.
- ESRI.APWR.UNIQUEIDFIELD: Name of the field storing the last id used in. Default to LASTID.
- ESRI.APWR.IDNAMEFIELD: Name of the field storing the unique identifier's counter. Default to IDNAME.

For the LAYERKEYTABLE

- ESRI.APWR.LAYERKEYTABLE: Name of the LAYERKEYTABLE. Default to LAYERKEYTABLE.
- ESRI.APWR.LAYERNAMEFIELD: Name of the field storing the name of the layers. Default to LAYERNAME.
- ESRI.APWR.LAYERKEYTFIELD: Name of the field storing the name of the UniqueID field. Default to LAYERKEY.

3.2.2 UniqueIDs Definition

The unique identifiers managed by the UniqueID Manager are defined using the key ESRI.APWR.UIDS

```
<add key="ESRI.APWR.UIDS" value="HYDROID, HYDROID|MID, MARINEID" />
```

For example, for the unique identifier MID, MARINEID:

- MID: Name of the field to populate.
- MARINEID: Name of the key in the APUNIQUEID tables' IDNAME field.

3.2.3 Workspace vs. ADO Connection

The configuration also defines the type of connection to use to access the UniqueID tables (workspace or ADO), as well as the connection information for an ADO connection. The ADO connections support Microsoft Access, SQL Server or Oracle database connections.

To set up an ADO connection, the nodes `ESRI.APWR.DBFACTORY` and `ESRI.APWR.DBCONN` need to be specified explicitly. If they are not defined or left blank, the UniqueID Manager will assume by default that the UniqueID tables are located in the same workspace as the data being edited.

```
<add key="ESRI.APWR.DBFACTORY" value="System.Data.OleDb" />
<add key="ESRI.APWR.DBCONN"
value="Provider=Microsoft.Jet.OLEDB.4.0;Data
Source=C:\92Data\Northwind.mdb"/>
-->
```

3.2.2.1 Connection string to Access mdb

The ADO connection to an Access database (mdb file) can be defined as follows:

```
<add key="ESRI.APWR.DBFACTORY" value="System.Data.OleDb" />
<add key="ESRI.APWR.DBCONN"
value="Provider=Microsoft.Jet.OLEDB.4.0;Data
Source=C:\92Data\Northwind.mdb"/>
```

3.2.2.2 Connection String to SQL Server

The ADO connection to a SQL Server or SQL Express database can be defined as follows:

```
<add key="ESRI.APWR.DBFACTORY" value="System.Data.SqlClient" />
<add key="ESRI.APWR.DBCONN" value="Data
Source=server\sqlexpress;DataBase=TestDB;Integrated
Security=SSPI;Connect Timeout=30"/>
```

3.2.2.3 Connection String to SQL Server

The ADO connection to an Oracle database can be defined as follows:

```
<add key="ESRI.APWR.DBFACTORY" value="System.Data.OracleClient" />
<add key="ESRI.APWR.DBCONN" value="User Id=NHD;Password=NHD;Data
Source=nhdnetwo"/>
```


3.3 Tables Setup

3.3.1 Tables Design

The two tables used by the application have the following structures:

APUNIQUEID

Field	Type	Description
IDNAME	String	UniqueID counter's name
LASTID	Long	Last value used.

LAYERKEYTABLE

Field	Type	Description
IDFLDNAME	String	UniqueID field name
LAYERNAME	String	Layer name
LAYERKEY	String	Layer key corresponding to IDNAME in APUNIQUEID

The tables must be stored in the same location. When using a workspace connection, they must be in the same workspace as the layers they are managing.

Note: for a workspace connection, these tables **MUST** be created automatically using the Arc Hydro tools or using ArcCatalog (i.e. they must have an ObjectID field).

3.3.2 Populating the tables

Once the tables have been created, they need to be populated with the chosen layers/keys/values. When using Arc Hydro, the APUNIQUEID will be automatically created in the target workspace and populated with HydroID/0. These values can be edited as follows if the default values are not satisfactory.

- Open ArcMap and add the APUNIQUEID and the LAYERKEYTABLE table to the Table of Contents. Open these tables.
- Start an editing session by selecting Editor>Start Editing.

- Enter in the APUNIQUEID the different keys with their associated LASTID value. Note that this value is the last used unique identifier. The next id value to use is this value, incremented by 1.

Note: There is no check on the unicity of the HydroID values in the database. You must make sure that the different keys will not overlap by choosing intervals, which are big enough.

Attributes of APUNIQUEID	
IDNAME	LASTID
HYDROID	400050
MARINEID	0
KEYA	100012
KEYB	200035
KEYC	300047

Figure 3-3 – Populated APUNIQUEID table

Attributes of LAYERKEYTABLE		
IDFLDNAME	LAYERNAME	LAYERKEY
HYDROID	LAYER1	KEYA
HYDROID	LAYER2	KEYB
HYDROID	LAYER3	KEYB
HYDROID	LAYER4	KEYA

Figure 3-4 – Populated LAYERKEYTABLE

For a connection of type workspace, and if you have at least one layer in your geodatabase, you can also use the function ApUtilities > UniqueID Tables Manager to populate the tables. ApUtilities is available as a menu in Arc Hydro but also as standalone toolbar installed by the Water Utilities Framework (i.e. ApFramework).

3.4 Configuring a new UniqueID

The workflow to create a new UniqueID (e.g. TestID) that will be automatically populated by the UniqueID Manager is as follows:

Step 1 – Add a new record in the APUNIQUEID table for the new UniqueID with the following values:

```
IDNAME=TESTID
LASTID=0 - (last value used)
```

IDNAME	LASTID
HYDROID	0
MARINEID	0
TESTID	10

Figure 3-5 – New UniqueID in APUNIQUEID

Step 2 – Add a new UniqueID combination node in the configuration file ArcMap.exe.config stored by default under C:\Program Files (x86)\ArcGIS\Desktop10.1\Bin.

1. name of the field whose value needs to be populated
2. Key (value) in the APUNIQUEID table's IDNAME field .

```
<add key="ESRI.APWR.UIDS"
value="HYDROID, HYDROID | MID, MARINEID | TESTID, TESTID" />
```

4.0 Appendix – Configuring an Oracle Net Service Name

The ADO connection to an Oracle database requires that a Net Service Name be defined first on the client machine. This net service name is the parameter defined as “Data Source” when setting the Oracle ADO connection in ArcMap.exe.config.

```
<add key="ESRI.APWR.DBFACTORY" value="System.Data.OracleClient" />
<add key="ESRI.APWR.DBCONN" value="User Id=NHD;Password=NHD;Data
Source=nhdnetwo"/>
```

To set up a Net Service Name for Oracle on a client machine, you need first to install the Oracle client and then configure a Net Service Name so that the client can access the Oracle database.

- Install the Oracle Client and open the Net Configuration Assistant

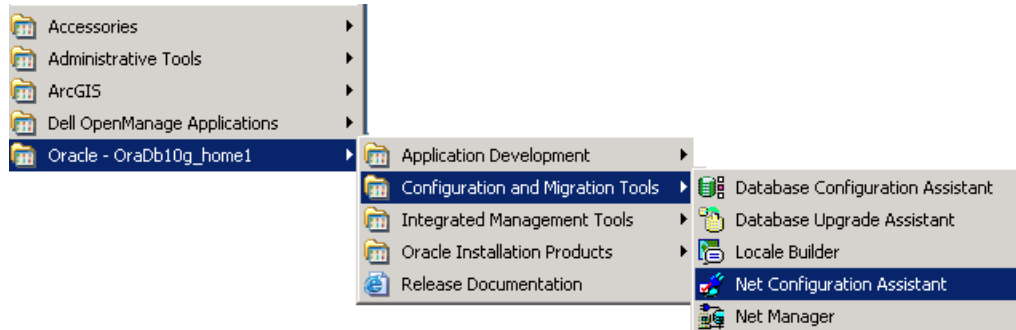


Figure 4-1 - Net Configuration Assistant Location

- In the Welcome window select Local Net Service Name configuration and click Next.

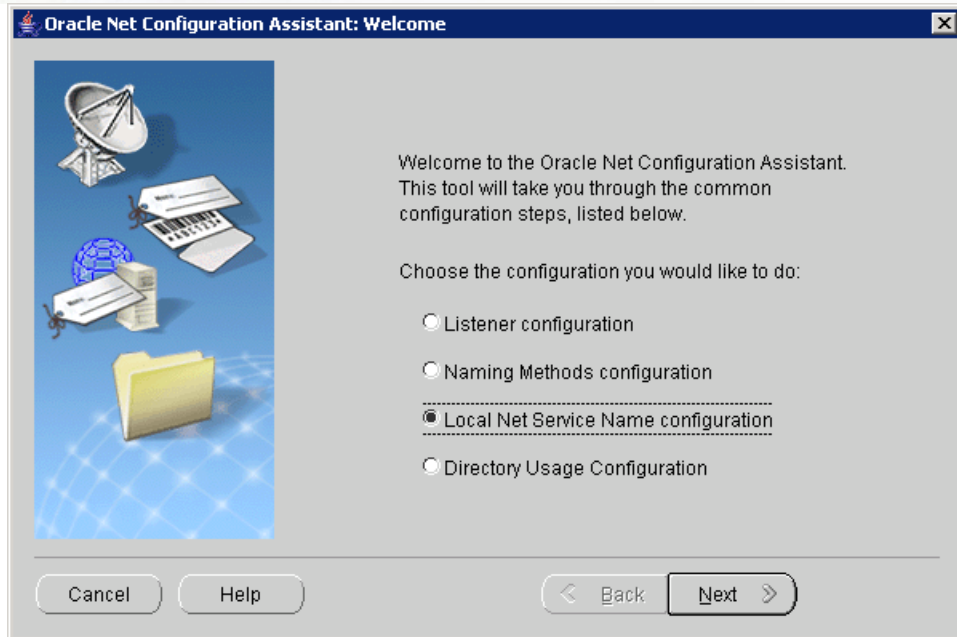


Figure 4-2 -- Net Configuration Welcome Window

- Select Add to create a Net Service Name.

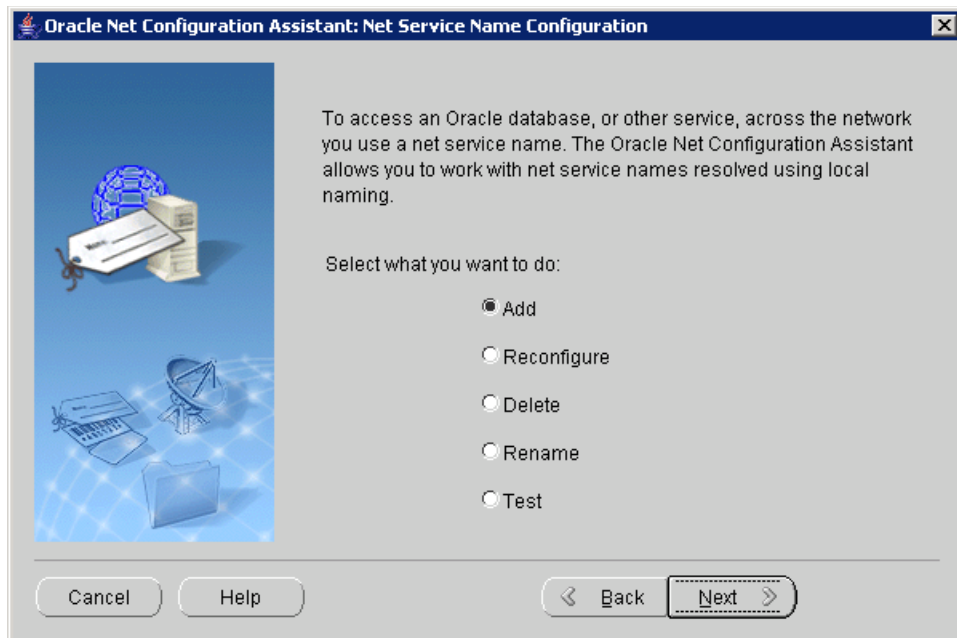


Figure 4-3 – Net Configuration Add Window

- Enter the Service Name (= global database name). Note that you may look up this service name in the file `tnsnames.ora` located on the server in the Oracle Home under `OracleHome/Network/admin` (e.g. `SERVICE_NAME = nhdnetwo.esri.com`).

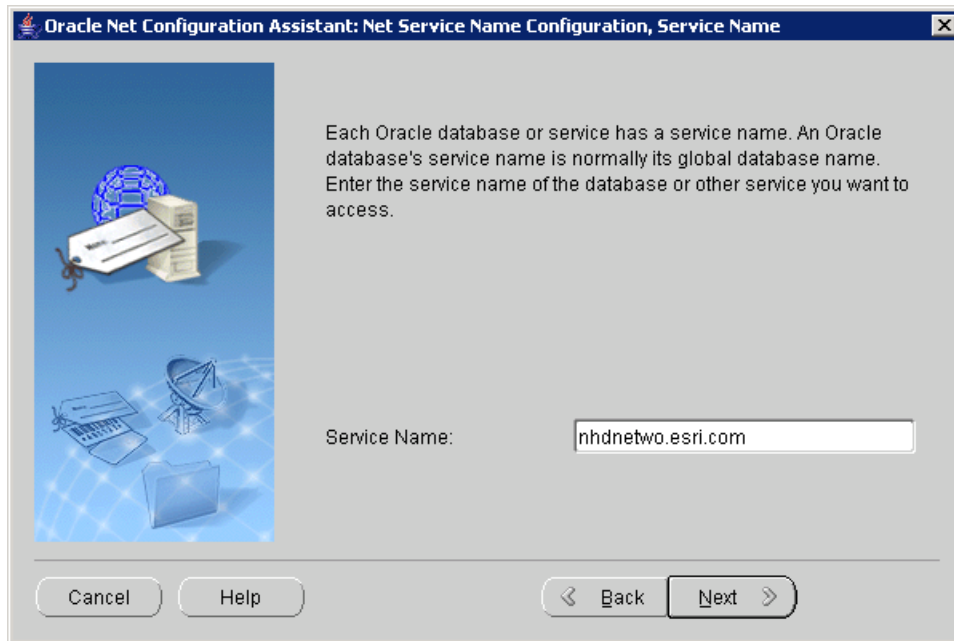


Figure 4-4 – Net Configuration Service Name Window

- Select TCP as the network protocol.

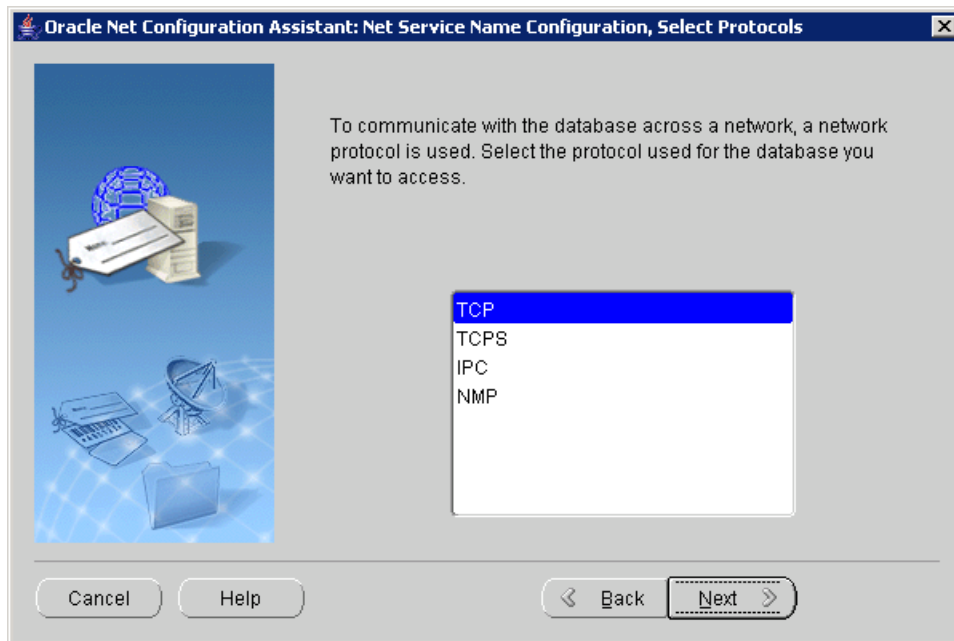


Figure 4-5 – Net Configuration Protocol Window

- Enter the name of the server on which the database is located (e.g. seademon) and click Next.

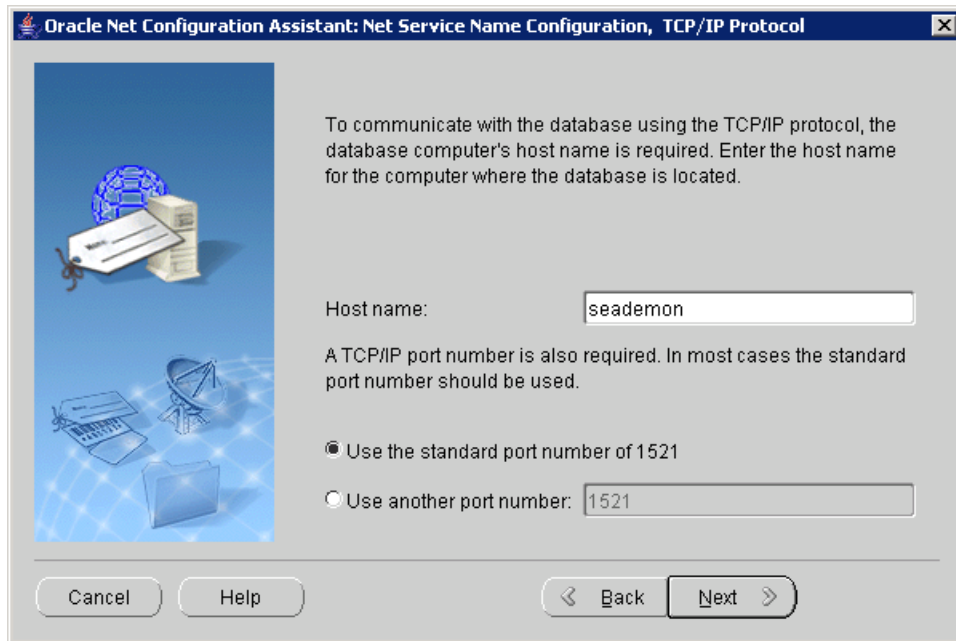


Figure 4-6 – Net Configuration Protocol Settings Window

- Connection test (Note: you may need to change the login from the default setting).

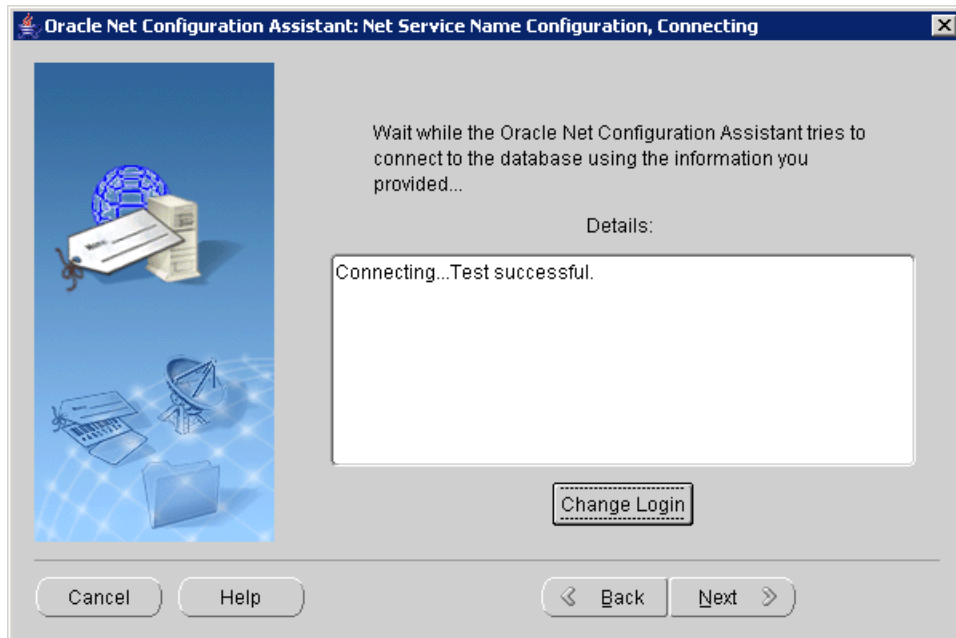


Figure 4-7 – Net Configuration Connection Test Window

- After testing, click Next and enter the Net Service Name. Click Next and Finish.

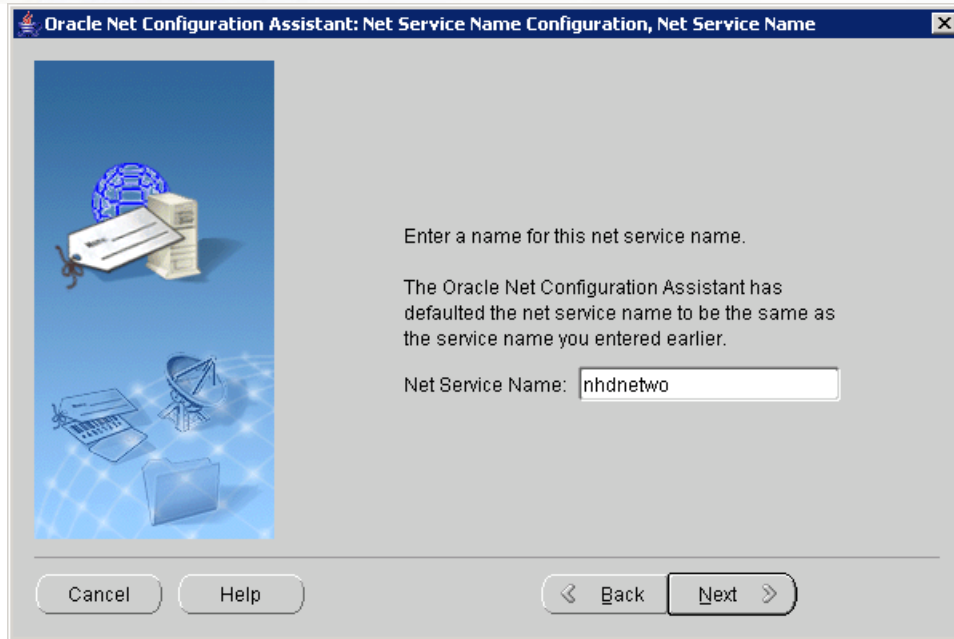


Figure 4-8 – Net Configuration Net Service Name Window