

Title: Successful Business Continuity – Part 2 of 5

This is the second in a series of articles discussing how to implement AIX in an environment dedicated to business continuity. The topic of this article is the assignment of machine names, host names, adapter names, aliases, etc. It is important that the naming scheme provide enterprise wide unique values for each network location for normal operations as well as for disaster recovery and business continuity. The techniques discussed here will illustrate the need for a unique naming scheme for each network location and what constitutes a network location.

This series of articles defines many IT areas that require enterprise wide policies, guidelines, standards, and procedures be defined, and offers recommended solutions for those defined areas. The areas discussed includes:

- Part 1:
 - User Names and UID Numbers
 - Group Names and GID Numbers

- Part 2:
 - Machine names
 - Hostnames
 - Boot adapter and service names
 - Resource group names
 - Aliases

- Part 3:
 - Volume Groups
 - Major Numbers
 - Logical Volumes
 - JFS Log Logical volume names
 - Mount points

- Part 4:
 - MQ Series Queue names and aliases
 - Resource Group start/stop scripts
 - Error logging
 - Error Notification

- Part 5:
 - Automated Documentation

- Console Access
- Job Scheduling
- Project Planning

The purpose of this series of articles is to provide a foundation for business continuity. In support of that purpose, each topic discussed in this article is divided into the following:

- Policies
- Guidelines
- Standards
- Procedures

Each organization should define their own set of policies, guidelines, standards and procedures that define their enterprise wide rules of design and implementation. These rules ensure the ability of an organization to operate on a day-to-day basis as well as in a disaster recovery effort.

Definition: Enterprise wide unique - refers to a parameter that has one distinct value across any or all platforms throughout the entire enterprise.

Naming Scheme

In order to achieve maximum flexibility during normal maintenance, disaster recovery, and business continuity efforts, it is important to provide a naming standard for business functions that can be translated easily into machine names and/or resource groups. The purpose of using hostnames instead of IP addresses is that they are easier to remember and use. Hostnames are not necessary, but usually desirable.

In many organizations, it is policy that hostnames should not reflect the supported business function. The recommendations here will use business functions to derive hostname examples because it makes the principles discussed here easier to understand. Translation of the logic behind the naming structure, to an environment where using business functions to derive hostnames is against policy, will be an exercise left to the reader.

Designing backwards from the business continuity perspective, we will want to provide names for business functions, assign those business functions to applications, identify the resources supporting those applications, and provide naming structures

for supporting those resources. This means that to define hostnames, we will begin by identifying business functions.

First define the business functions associated with your organization, such as:

- warehousing
- finance
- transportation
- etc.

Divide these business functions into resource groups; warehousing is used here as an example:

- Seattle warehouse
- Phoenix warehouse
- Dallas warehouse
- St Louis warehouse
- Atlanta warehouse
- Baltimore warehouse
- Boston warehouse
- Cleveland warehouse
- Chicago warehouse
- Fargo warehouse
- etc.

Each of these defines a group of resources that support the business function. These resources include applications, computer hardware and software, networking hardware and software, SAN disks, NAS disks, etc. Each resource group should be given a name that is used to identify it. This name will be used by users to access the various resources associated with this resource group. In order to achieve maximum flexibility during maintenance, disaster recovery, and business continuity, the name assigned to this resource group will be used as a DNS alias to the networking resources supporting this resource group. A DNS alias is normally referred to as a "CNAME" record. Users requiring access to the business functions provided by any resource group should only use the alias name for the resource group specified by the DNS CNAME record. Users should never access business functions using machine names or network adapter names.

System administrators may need to access the systems in a variety of ways such as for maintenance, support, troubleshooting, failover, backups, etc. In order to provide a consistent approach for these needs, a naming structure should be defined. This

naming structure will identify machine names, host names, network adapter names, backup interface names, system management names, and any names required for system administration. Each of the administration names assigned should also have an associated IP address. Each of these names should be enterprise wide unique DNS "A" records. The machine name should be identified separately from the host name because a single AIX machine may house several hosts, so for configuration management purposes, the machine should have a name different from the host, even on machines with only one host (single standard)

Policies: Naming Scheme

All business functions will be identified by resource group names.

Users may only access business functions using resource group names.

Each resource group will have an enterprise wide unique DNS name defined in the DNS as a "CNAME" record (different from the network adapter, host, or machine names).

Each Network adapter will have an enterprise wide unique DNS name defined in the DNS as an "A" record (different from the host or machine names).

Each AIX host will have an enterprise wide unique DNS name defined in the DNS as an "A" record (different from any network adapter name).

Each AIX host will have an enterprise wide unique system management name defined in the DNS as an "A" record (different from any network adapter name).

Each AIX host will have an enterprise wide unique backup name defined in the DNS as an "A" record (different from any network adapter name).

Each AIX machine will have an enterprise wide unique name to identify it separately from the hosts contained in the enclosure. (Configuration Management purposes)

Guidelines: Naming Scheme

Only the service aliases are meant to be accessed by regular users, all other names are reserved for use by system administration personnel.

Service aliases may be a name that is easily remembered by regular users and may reflect some specific business function or activity.

Each name should be 14 characters or less, aliases should be 8 characters or less.

Standards: Naming Scheme

Begin by identifying the business functions and derive a naming standard from that perspective.

Business Function Naming: Assign a 3 letter identifier for each business function, examples:

Administration and Financial (adm)

acp = Accounts payable
acr = Accounts receivable
acc = Accounting Fixed assets
bud = budgeting
ord = order entry
per = personnel
ach = checks
abr = bank reconciliation
pro = profit sharing
tra = travel expenses
prp = profit planning
tre = treasury
pur = purchasing
pay = payroll

Marketing (mar)

quo = quotations
reb = customer rebates
sal = customer sales
mon = monthly sales
sta = sales statistics

Distribution (dis)

pic = warehouse picking
dtr = transportation
con = contract management
war = warehouse management

General Services (gen)

mai = electronic mail
off = office systems

Manufacturing (man)

bom = Bill of materials/labor
cos = job costing
for = forecasting
sch = master schedule
rou = routing/capacity planning

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qua = quality control
saf = safety

Resource Group Naming: Assign a name for each resource group using the business function name followed by a 2 digit number. This will uniquely identify multiple instances of a resource group in separate environments or simultaneously in a single environment. Examples:

Distribution

pic01 = warehouse picking (Phoenix)
pic02 = warehouse picking (Dallas)
pic03 = warehouse picking (Atlanta)
pic04 = warehouse picking (Boston)
pic05 = warehouse picking (Chicago)
pic06 = warehouse picking (Fargo)

dtr01 = transportation (Phoenix)
dtr02 = transportation (Dallas)
dtr03 = transportation (Atlanta)
dtr04 = transportation (Boston)
dtr05 = transportation (Chicago)
dtr06 = transportation (Fargo)

con01 = contract management (Phoenix)
con02 = contract management (Dallas)
con03 = contract management (Atlanta)
con04 = contract management (Boston)
con05 = contract management (Chicago)
con06 = contract management (Fargo)

war01 = warehouse management (Phoenix)
war02 = warehouse management (Dallas)
war03 = warehouse management (Atlanta)
war04 = warehouse management (Boston)
war05 = warehouse management (Chicago)
war06 = warehouse management (Fargo)

Resource Group Alias Names: Create DNS alias names for each resource group. Use a naming structure that would make sense to the user, such as pre-pending a 3 letter city code to the business function code. Examples:

Distribution (dis)

phopic = Alias name for Phoenix warehouse picking resource group
dalpic = Alias name for Dallas warehouse picking resource group
atlpic = Alias name for Atlanta warehouse picking resource group
bospic = Alias name for Boston warehouse picking resource group
chipic = Alias name for Chicago warehouse picking resource group
farpic = Alias name for Fargo warehouse picking resource group

phodtr = Alias name for Phoenix transportation resource group

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daldtr = Alias name for Dallas transportation resource group
atldtr = Alias name for Atlanta transportation resource group
bosdtr = Alias name for Boston transportation resource group
chidtr = Alias name for Chicago transportation resource group
fardtr = Alias name for Fargo transportation resource group

phocon = Alias name for Phoenix contract management resource group
dalcon = Alias name for Dallas contract management resource group
atlcon = Alias name for Atlanta contract management resource group
boscon = Alias name for Boston contract management resource group
chicon = Alias name for Chicago contract management resource group
farcon = Alias name for Fargo contract management resource group

phowar = Alias name for Phoenix warehouse management resource group
dalwar = Alias name for Dallas warehouse management resource group
atlwar = Alias name for Atlanta warehouse management resource group
boswar = Alias name for Boston warehouse management resource group
chiwar = Alias name for Chicago warehouse management resource group
farwar = Alias name for Fargo warehouse management resource group

Resource Group Service Names: Create DNS "A" record names for each resource group. Using the resource group names, prepend the 3 letter identifier for the general category to the beginning. Examples:

Distribution (dis)

dispic01 = Service name for Phoenix warehouse picking resource group
dispic02 = Service name for Dallas warehouse picking resource group
dispic03 = Service name for Atlanta warehouse picking resource group
dispic04 = Service name for Boston warehouse picking resource group
dispic05 = Service name for Chicago warehouse picking resource group
dispic06 = Service name for Fargo warehouse picking resource group

disdtr01 = Service name for Phoenix transportation resource group
disdtr02 = Service name for Dallas transportation resource group
disdtr03 = Service name for Atlanta transportation resource group
disdtr04 = Service name for Boston transportation resource group
disdtr05 = Service name for Chicago transportation resource group
disdtr06 = Service name for Fargo transportation resource group

discon01 = Service name for Phoenix contract management resource group
discon02 = Service name for Dallas contract management resource group
discon03 = Service name for Atlanta contract management resource group
discon04 = Service name for Boston contract management resource group
discon05 = Service name for Chicago contract management resource group
discon06 = Service name for Fargo contract management resource group

diswar01 = Service name for Phoenix warehouse management resource group
diswar02 = Service name for Dallas warehouse management resource group
diswar03 = Service name for Atlanta warehouse management resource group
diswar04 = Service name for Boston warehouse management resource group
diswar05 = Service name for Chicago warehouse management resource group
diswar06 = Service name for Fargo warehouse management resource group

Machine Names: For the purpose of providing enterprise wide unique machine names, it is recommended the serial numbers be used to identify the AIX machines. This is a useful practice in Configuration Management to identify machines supporting multiple LPAR's, with multiple hosts. It allows the machine enclosure to be identified separately from each of the hosts it supports. For RS/6000 architecture machines, the serial number should be prepended with an "r", for pSeries architecture machines, the serial number should be prepended with a "p". Examples:

Architecture Type	Serial Number	Machine Name
RS/6000	10-12345	r1012345
RS/6000	10-23456	r1023456
pSeries	12-34567	p1234567
pSeries	12-45678	p1245678
pSeries	12-56789	p1256789

Host Names: Using serial numbers as part of the machine name works well, however attempting to use the serial number as part of the host name is quite confusing in real practice. A more administrator friendly method of identifying hosts should be implemented. Host names should allow a host to be identified uniquely, quickly, and exactly without confusion. Host names will only be used by administrators; users should never access a host by its host name.

Since a machine may contain more than one host, each host in a machine must be uniquely identified. To provide an enterprise wide unique identity, a two digit number base 36 number is assigned for each host within a machine. A base 36 number would be in the range of 0-Z:

(0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ).

A double digit base 36 number provides 1296 possible combinations, which translates to 1296 possible hostnames per machine. For most organizations, this can probably be reduced to a single digit providing 36 hostnames per machine. For a machine architecture that is only capable of supporting a single host, it is recommended that a host number of '00' or '0' be assigned.

One assumption of "Business Continuity" is usually there is an alternate site where "Disaster Recovery" efforts are performed. Using this assumption to derive a host naming structure, a 3 letter identifier for the data center where the host exists may be used as part of the host name. Examples of 3 letter data center identifiers:

ddc = Dallas Data Center

bhq = Boston Headquarters
 awh = Atlanta warehouse
 pdc = Phoenix Data Center

Assuming a multi-platform environment, it will also be useful to identify the platform using a 3 letter identifier in the host name:

aix = AIX
 as4 = AS/400
 mvs = MVS

Combining the elements of platform type, location, double digit base 36 machine identifier, and a single digit base 36 host identifier, into a hostname. As an example, to derive the hostname for an AIX machine that exists in the “Dallas Data Center”, assigning it an enterprise wide unique, 3 digit base 36 identifier of “001”, and assigning it a partition identifier of “A”: the derived host name becomes “aixddc001A”.

The 3 digit base 36 identifier should be an enterprise wide unique value for each machine, this number should not be duplicated within a data center or between data centers. Ensuring the uniqueness of this value allows the hostnames to be manipulated in any way that makes sense for an organization.

It may be useful to assign a range of values from the enterprise wide unique base 36 identifier for each data center, thus allowing the host name to be shorted using that identifier, while maintaining the ability to group hosts by location. For instance assigning range of “000 – 8ZZ” to the Dallas Data Center, “900 – DZZ” to Boston Headquarters, “E00 – MZZ” to the Atlanta Warehouse, and “N00 – ZZZ” to the Phoenix warehouse. This would permit unique identification of each host while at the same time identifying its location. The host name could be shorted from “aixddc001A” to “a001A”. The leading “a” identifies the platform type as “AIX”.

This method would limit the total number of hosts allowed in the numbering scheme by data center, but it may make sense depending upon the goals of an organization. Examples of long and short host names:

Machine Name	Long Host Name	Short Host Name	Partition
r1012345	aixddc0010	a0010	No partition
r1023456	aixddc0020	a0020	No partition
p1234567	aixawhe01A	ae01A	First LPAR

p1234567	aixawhe01B	ae01B	Second LPAR
p1234567	aixawhe01C	ae01C	Third LPAR
p1245678	aixpdcn01A	an01A	First LPAR
p1245678	aixpdcn01B	an01B	Second LPAR
p1256789	aixbhq903A	a903A	First LPAR
P1256789	aixbhq903b	a903B	Second LPAR

Network Adapter Names: In an HACMP environment, IP addresses associated with network adapters may float from adapter to adapter and between hosts, therefore it is recommended that the network adapter names not be associated with any particular machine name, host name, or network adapter. In order to support normal maintenance, disaster recovery, and business continuity efforts, network adapter names will not be tied to any particular resource group, because under certain conditions, a network adapter may be required to support multiple resource groups.

In an HACMP environment, three different adapter functions need to be considered for the naming structure. Those functions are:

- Service
- Boot
- Standby

In non-HACMP environments, the adapter functions would be limited to “boot” and the naming structure should reflect that. Meaning the network address assigned at boot time will not likely change, therefore the naming structure derived to support the HACMP environment should work in the non-HACMP environment as well.

Depending upon the HACMP configuration, a machine may be configured with 2 or more of the adapter functions. In configurations using IPAT via IP address takeover, a boot IP address will need to be assigned to at least one network adapter. Also at least one standby IP address will be assigned to a network adapter. In this configuration the boot IP address is switched with the service IP address when a resource group is brought on-line. In the event of a failure of the service network adapter, the standby address on another adapter is switched with the service address on the failed adapter.

In HACMP configuration using IPAT via IP aliases, all adapters will have boot addresses, they may all also have a heartbeat address, and the service addresses are dynamically aliased onto the network adapter as needed. Therefore, each network

adapter will require a boot name associated with the boot address. A heartbeat name is not required.

Therefore, in order to support both HACMP configuration options, it is recommended that a boot name be assigned to each adapter, regardless of whether or not it is used. This will provide the greatest flexibility for future configuration changes, disaster recovery, and business continuity efforts.

In the following examples, the network adapter boot names will reflect the name of the data center and host name in which they exist. The boot name will not be associated with the resource group it supports.

Boot name examples:

Platform	Location	Machine	Network	Long Host Name	Short Host Name
Aix	Dallas	0010	0	Aixddc00100	A00100
Aix	Dallas	0010	1	Aixddc00101	A00101
Aix	Dallas	0010	Management	Aixddc0010m	A0010m
Aix	Dallas	0010	Backup	Aixddc0010b	A0010b
Aix	Dallas	0020	0	Aixddc00200	A00200
Aix	Dallas	0020	1	Aixddc00201	A00201
Aix	Dallas	0020	Management	Aixddc0020m	A0020m
Aix	Dallas	0020	Backup	Aixddc0020b	A0020b
Aix	Dallas	003a	0	Aixddc003a0	A003a0
Aix	Dallas	003a	1	Aixddc003a1	A003a1
Aix	Dallas	003a	Management	Aixddc003am	A003am
Aix	Dallas	003a	Backup	Aixddc003ab	A003ab
Aix	Boston	903a	0	Aixbhq903a0	A903a0
Aix	Boston	903a	1	Aixbhq903a1	A903a1
Aix	Boston	903a	Management	Aixbhq903am	A903am
Aix	Boston	903a	Backup	Aixbhq903ab	A903ab
Aix	Boston	903b	0	Aixbhq903b0	A903b0
Aix	Boston	903b	1	Aixbhq903b1	A903b1
Aix	Boston	903b	Management	Aixbhq903bm	A903bm
Aix	Boston	903b	Backup	Aixbhq903bb	A903bb

The recommended list of names to be defined for each machine, host, and adapter is:

- 3 letter business function identifier
- Resource group name
- Resource group alias (for user access)
- Service name(s) associated with each resource group
- Machine name
- 3 character base 36 Enterprise wide unique machine ID
- 3 letter location identifier

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- 3 letter platform identifier
- Boot name of each network adapter (Using short host name)
- Alias to Boot name of each network adapter (Using long host name)
- System Management name
- Backup/Restore Name

This list of names to be defined for each machine, host, and adapter translates into the following DNS requirements:

- DNS “A” records:
 - Boot name of each network adapter (Using short host name)
 - Service name(s) associated with each resource group
 - System Management Name
 - Backup/Restore Name

- DNS “CNAME” Records:
 - Resource group (Service) alias (for user access)
 - Alias to Boot name of each network adapter (Using long host name)

The following table provides several examples of the various names described here. In the following table of examples, the term “Service Alias” is used interchangeably with “Resource Group Alias”:

Machine	Host	Mgmt	Backup	Boot	Boot Alias	Service	Service Alias
R1012345	A0010	A0010m	A0010b	A00100 A00101	Aixddc00100 Aixddc00101	Dispic02	Dalpic
R1023456	A0020	A0020m	A0020b	A00200 A00201	Aixddc00100 Aixddc00101	Diswar02	Dalwar
P1234567	Ae01a	Ae01am	Ae01ab	Ae01a0 Ae01a1	Aixawhe01a0 Aixawhe01a1	Diswar03	Atlwar
P1234567	Ae01b	Ae01bm	Ae01bb	Ae01b0 Ae01b1	Aixawhe01b0 Aixawhe01b1	Disdtr03	Atldtr
P1256789	A903a	A903am	A903ab	A903a0 A903a1	Aixbhq903a0 Aixbhq903a1	Admacp04	Bhqacp
P1256789	A903b	A903bm	A903bb	A903b0 A903b1	Aixbhq903b0 Aixbhq903b1	Admacr04	Bhqacr

The naming scheme described here will probably seem to be a radical departure from currently implemented structures. However the purpose of this structure is to provide flexibility for maintenance, disaster recovery, and business continuity. The use of aliases for user access ensures the users can be directed easily and quickly to the resources configured to service their requests, even if those resources are subject to change frequently. In the past, service names have probably been configured to reflect the primary host name on which a resource group was configured. This new structure recognizes that a resource group may float freely between hosts, machines, and/or data centers.

Distinguishing between machine name and host name is important for Asset and Configuration management. It provides a granular separation of resources devoted to specific tasks and can be used for a variety of accounting practices, including chargeback.

The overall theme to the naming structure is enterprise wide unique values. This concept will be reinforced repeatedly in this series of articles because it is vitally important to disaster recovery and business continuity. Unique values allow the referenced resources to be uniquely identified, regardless of the location or condition of the resources. Unique values also eliminate problems due to duplicate value conflicts during a time critical activity, such as disaster recovery.

Procedures: Naming Scheme

To define a new machine, host, resource group, hostname alias, etc for use in an organization, the following set of procedures should be followed:

1. Assign the new machine in support of new or existing business function(s).
2. Assign new or existing resource group(s) associated with the business functions to be supported on the new machine.
3. Define service name(s) and service aliases for each resource group to be supported on the new machine. Also assign TCP/IP addresses to service name(s).
4. Define hostname, management name, and backup name to be assigned on the new machine and also assign TCP/IP addresses to each name.
5. Define boot name(s) and boot aliases for each network adapter to be assigned on the new machine and assign TCP/IP addresses to each adapter.
6. Define a machine name using the machine's serial number.
7. Perform DNS changes.
8. Perform name and TCP/IP address assignments on the new machine.

Conclusion:

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In addition to the main purpose of business continuity, the rules described in this article are also meant to provide a single set of policies, guidelines, standards, and procedures that can be implemented enterprise wide for clustered as well as non-clustered AIX machines.

The next article in this series will naming structures for volume groups, logical volumes, JFS log logical volume names, and mount points, for use in a business continuity environment.