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Managing It All

AIX 6 features simplify WPAR management

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As systems grow and become more complex, organizations go from individual systems to heavily consolidated sets of LPARs. LPAR and workload-partition (WPAR) management is still a time-consuming process. This issue's theme explores options to simplify systems management and this article will examine a method to create, track, manage and monitor WPARs to take advantage of all that they offer without creating a management nightmare.

IBM AIX* 6 includes a new feature called Workload Partitions Manager* (WPAR Manager). WPAR Manager isn't required to create and administer WPARs, as these can be managed using AIX line commands, but it's recommended for complex environments with many WPARS. WPAR Manager is required for Live Application Mobility (LAM). In this article I'll outline how the WPAR Manager for AIX systems greatly simplifies WPAR management. To start, let's quickly review WPARs.

WPARs

The WPAR facility comes standard with AIX 6 and can run on any POWER4* processor or higher System p* server. A WPAR allows the user to have one AIX image called the global instance and a series of sub-images called WPARs. Each of these sub-images uses resources from the global instance, but will have some private file-systems, its own networking, security and administrative domains, and can be regulated using the AIX resource control functions of workload manager (WLM). There are two types of WPARs: system workload partition and application workload partition.

A system WPAR is similar to a complete AIX instance in that it has its own processes and daemons to control the system and network (cron, inetd, init, etc.). The system WPAR is shut down only when requested and functions as a full AIX environment. An application WPAR is designed specifically to run isolated application processes and the WPAR disappears when the last application process ends. More information can be found in the IBM Wiki (www.ibm.com/ developerworks/wikis/display/ WikiPtype/WPAR).

WPARs can reduce the number of AIX images running in separate LPARs taking up resources. They also allow you to group applications together under the same kernel image for consistency and simplicity. Because it's easy to create and utilize WPARs, it becomes important to manage these resources. This is where WPAR Manager for AIX can help.

WPAR Manager Concepts

WPAR Manager facilitates WPAR administration across multiple systems. It provides a single GUI interface to create, clone, start, stop, monitor and otherwise control WPARs— vastly simplifying WPAR management. It also provides the capability to use LAM to move an application WPAR from one system to another without an outage. This can be done on demand or can be set up as policy-driven mobility, where WPARs are automatically moved based on performance policies. Using automated application mobility provides the capability to use WPAR Manager to provide global load balancing.

WPAR Manager for AIX systems is a separately priced licensed program product or is included in the AIX Enterprise Edition (EE) suite. Under the covers, WPAR Manager consists of the manager, some agents, a Web interface and server, and one of two databases: DB2* (V9.5) or Apache Derby (V2.0). WPAR Manager for AIX V1.2 supports both static and live WPAR relocation and also provides a WPAR backup and restore function. WPAR Manager includes WPAR management console, WPAR management server and a kernel extension for checkpoint and restart called the Metacluster Checkpoint and Restart (MCR). An additional component is the WPAR Manager agent, which is required to run on all the managed systems (the term used for an LPAR running WPARs being managed by WPAR Manager).

Prerequisites

Before working with WPAR manager it's important to design how you plan to use it. When a WPAR is set up, you must know if you plan to use mobility features. If so, perform the following:

1. NFS mount the private file systems attached to that WPAR.
2. Run network time protocol (NTP) to ensure the time is set correctly on all of the WPARs to ensure a smooth relocation.
3. Flag the WPAR as "Available for relocation" when it's defined.
4. Document hardware and software levels for all the WPARs you want to manage and potentially relocate.

AIX technology levels restrict which MCR extension and which version of the WPAR Manager agent can be used. A compatibility matrix is provided in the WPAR Manager book, "SC23-5241-01 IBM Workload Partitions Manager for AIX" (http://publib.boulder.ibm.com/infocenter/systems/topic/com.ibm.aix.wparlpp/wparlpp.pdf). Prior to installing WPAR Manager or the agent, it's important to check there's available disk space in the root file-systems, specifically /, /var, /home and /opt. User IDs should also be allocated for WPAR Manager and the embedded database. There are some restrictions on how application mobility can be implemented between two systems. Currently, managed systems used as departure and arrival systems for mobility must be within the same subnet. Additionally, source and destination servers should run on compatible hardware, and have compatible software.

Both system WPARs and application WPARs have specific requirements for file system setup and NFS mounts. Attention should be paid to these in the WPAR-planning process. More information is provided in the IBM Redbooks* publication, "Introduction to Workload Partition Management in IBM AIX Version 6.1" (SG24-7431-00).

Security

Plan security in advance. The user ID and role mappings combination controls access to applications. There are four application roles on WPAR Manager. Determine who's assigned each role, and when. Four default roles are administrator, WPARAdministrator, WPARUser and WPARMonitor. The root user is automatically assigned the administrator and WPARAdministrator roles, but it might be necessary to assign the root user other roles or to assign those roles to other users, depending on your site's security policies. WPAR Manager uses the local AIX user IDs, so map the roles to those user IDs if changes are made.

Installation

The first step is to ensure the OS has all prerequisites installed and an NFS server is available. Additionally, NTP should be installed and configured on all of the global instances and the NFS server, and all IP addresses should map to valid host names.

Once the OS image is installed on the LPAR or server that's going to be the WPAR Manager, log in as the root user to perform the rest of the installation. The first step is to install the wparmgt.mgr fileset from the install DVD or CD. Then the database gets installed (wparmgt.db) and the database installation script runs. The values you use during the database install should be written down, as they're needed for the WPAR Manager configuration.

The next step is configuring the WPAR Manager using the WPMConfig.sh command–which can be run at the console, via a GUI or in silent mode from a predefined set of parameters. Now, WPAR Manager is installed on the management server.

Now the manager is running, it's necessary to install and configure the agents. The agents run on the managed systems (global instance) and communicate with the agent-manager piece of WPAR Manager. The agent has specific prerequisites for Java* 5.sdk, bos.wpars and perfagent.tools, as well as AIX 6. Four filesets must be installed for the agent: wparmgt.agent.rte, wparmgt.cas.agent, tivoli.tivguid and mcr.rte. This may change over time, so be sure to check the readme files first as well as the latest IBM Redbooks publication, "IBM Workload Partitions Manager for AIX" (SC23-5241-01). The next step is to run the configure-agent script. Choose the network ports it will use and you should know the WPAR Agent Manager host name. You can now use the wparagent script to start and stop the agents.

Post Installation

Now the WPAR Manager is running and the first agent is installed and started, you must register the WPAR Manager agents. To register, run the configure-agent script and provide the WPAR Manager hostname and the database agent password. Once this is done the new managed system should be discovered and available for view. You can also have the WPAR Manager issue the discover command, to try and find agents it might not have registered.

WPAR Manager GUI

WPAR Manager supports Firefox 1.5 and Internet Explorer 6 or higher. Specify the correct port, and you can use the Internet browser to connect to the WPAR Manager. You should then see four tabs. The first is the Managed System tab, where you'll see the list of systems that have successfully registered their agents with the manager. From this area, you can view configuration details and update them as necessary. Making changes to the profile will cause a compatibility analysis. The compatibility analysis output is used later to ensure when a relocate request is

issued, the manager doesn't attempt to relocate the WPAR to a system to which it isn't compatible. Under "Managed Systems" there's also a Performance Metrics area, where you can view performance trends and some historical graphs.

The section you'll use the most is the WPARs tab. This is where you create and manage WPARs. They can be created manually or as clones of an existing WPAR. If you plan to use mobility, don't forget to flag the Enable Relocation option. Without it, the WPAR isn't enabled for relocation. This is also where to start and stop WPARs, delete them, change their properties, look at more performance metrics, check compatibility and, of course, tell a WPAR to relocate.

The Task Activity tab allows you to see the results of a command, or track progress of a command. It will show the command output, any errors and will also provide the path to error logs.

The fourth tab is called "WPAR Groups." By default, all WPARs go to a default group, but you can combine similar WPARs into specific groups. This allows you to create policies to automate behavior based on WPAR type. As an example, you could have a Web server WPAR group, where all Web servers are collected. Based on workload metrics, you may have the WPAR Manager automatically relocate WPARs within that group to other servers to improve performance.

Don't Forget

Since the embedded database contains all of the information about the WPAR Manager, it's important to include it in any backup and restore plans. WPAR Manager provides a script to handle backups and restores as needed.

For security reasons, it might be necessary to change the passwords on the database instance regularly. There's a specific procedure for doing this through WPAR Manager.

WPAR Manager provides robust and simplified oversight of your entire WPAR set. It makes it easy to create, clone, start, stop and monitor WPARs from one place. It also enables the local area microcomputer feature, which makes it simple to move a live application from one system to another, either manually or automated via policies. This provides a powerful solution for cross-system WPAR management. The access point is your Web browser, which means no additional software must be installed on the administrator's PC. For anyone who's running more than five or six WPARs, the WPAR Manager should significantly reduce administrative load.