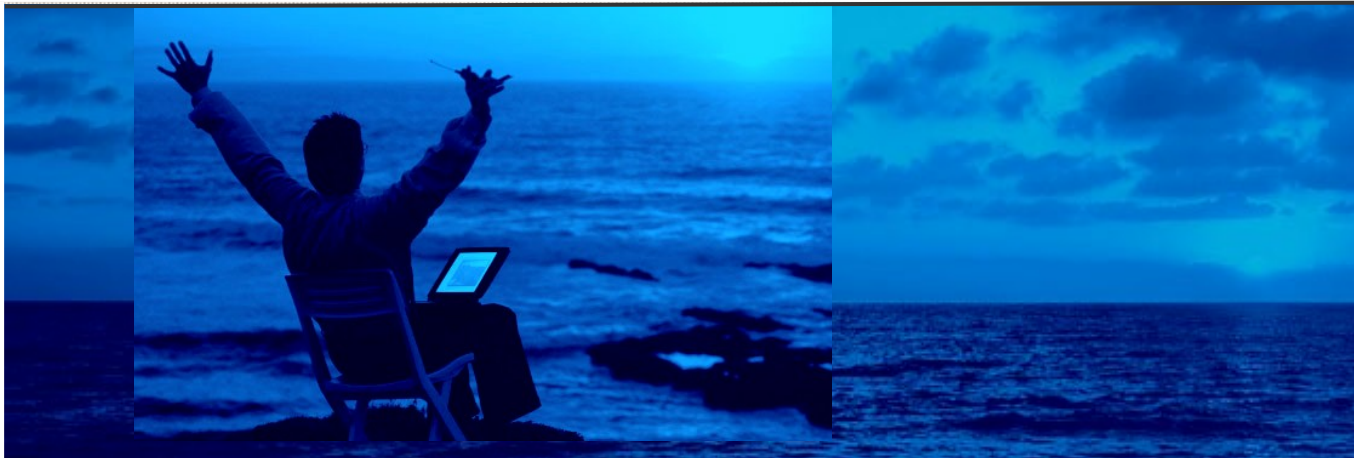




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NIM – Network Install Manager

Introduction Presentation

April 28, 2005

Introduction

- Presentation Scope
- NIM – Network Install Manager
 - OS Installation
 - Patch Management
 - Maintenance Booting
 - Diskless Booting
 - Software Installation
 - AIX and Linux Management
 - NIM Interface Choices
- NIM Server Design and Organization in the CGE Environment

Scope

- Presentation Scope
 - This presentation covers NIM standards, design and concepts in the CGE environment.
 - This presentation is not designed as a tutorial on NIM operations.

Types of NIM OS Installs

- RTE
 - Same as a single disk or most basic of installs to get an operating system on a server instance that will boot.
 - This is the fastest install.
- Spot
 - This is a full and customizable installation of a selected AIX OS level that can include patches and/or specific software.
 - This is generally the slowest of installs
- MKSYSB
 - This is instituted in one of two ways:
 - Clone Install of a system
 - Bare Metal Restore of a systems root volume group.
 - Takes an exact image of one system and keeps all file-sets intact while installing any hardware specific requirements to a new host.

Operating System Installation

- NIM is designed to install the AIX and Linux Operating systems. It can only install AIX operating systems that are equal or lower OS levels than that of itself. It can install Linux on either Power 4, Power 5 or Intel based platforms. The operating system level limitations do not exist for the Linux OS.
- NIM can install operating systems to a single host or to multiple hosts simultaneously. By creating a group of hosts within NIM, one can install many Linux and AIX based systems in an automated fashion.
- NIM allows for customization of operating system installations through pre and post actions.

NIM Patch Management

- NIM can keep many different patch bundles and install or upgrade systems one at a time or many at once.
- Different patch levels can be installed to different systems at the same time.
- NIM can manage any “*installp*” format file-set and can be used to manage any type of patch bundle. This includes OS and Applications. (HACMP, WLM, Performance Toolbox, etc.)
- NIM can patch its own operating system as well as Patch a “SPOT” to update installation file-sets.

Maintenance Booting

Reasons for Utilizing Process

- Boot errors
 - inittab
 - network configuration
 - kernel
 - ODM
- Change “root” password
 - root password of a machine can be changed by booting a machine into maintenance mode from the NIM server and performing the appropriate modifications.
- Fix filesystem problems
 - repair damaged filesystems
 - initialize JFS log
 - repair superblock

Diskless Booting

- Diskless Clients
 - Currently, CGE has no diskless clients booting from the NIM Server.
- Boot from SAN
 - The desired configuration is for all Unix servers to boot from SAN disk
 - Unix Servers shall not contain any internal disk
 - NIM installation of operating system is performed to SAN attached disk, virtual SAN disk, or logical volume presented as a virtual SAN disk
 - Requires each Unix server to have multiple HBA's for redundant access to SAN disk
 - HBA's may be real or virtual
 - Requires coordination and cooperation between Unix and Storage groups

Software Installation

- IBM “installp” based software
 - IBM software is distributed as AIX filesets
 - HACMP
 - TSM
 - MQ Series
 - Software is configured as an “lpp_source” in NIM server
 - Multiple versions may be maintained
 - Installation may be initiated locally from each client or remotely initiated from the NIM server
 - Server Prompted
 - Client Prompted

Software Installation (continued)

- Non-IBM software
 - 3rd party software may be distributed using NIM server
 - Oracle
 - Hitachi
 - Linux
 - 3rd party software may be distributed in a wide variety of formats
 - lpp_source (“installp format”)
 - rpm
 - package
 - compressed “tarballs”
 - NIM is a centralized location for storage of software and provides multiple mechanisms to provide access
 - NFS
 - FTP
 - ssh

AIX and Linux Management

- AIX Management
 - Bare metal installation of AIX base operating system or maintenance level
 - Maintenance level updates
 - Repair and rescue
- Linux Management
 - Bare metal installation of Linux base operating system
 - Multiple versions available for ppc architecture
 - SuSE
 - RedHat
 - Mandrake
 - Debian
 - Also supports virtualized environments
 - Repair and rescue

NIM Interface

- Command line Interface (CLI)
- SMIT (X-Windows based GUI)
- SMITTY (Character based GUI)
- WSM (Java based GUI)
 - Web Client (HTML and SSL based communication)
 - PC Client (Windows based platform)
 - Linux Client (X-Windows based GUI)
 - AIX Client (X-Windows based GUI)

NIM Server Design and Organization

- Data Centers
 - Mesquite Data Center (mdc)
 - Dallas Data Center (ddc)
- NIM Servers
 - Currently, one NIM server is configured for each data center
 - mdc – mdcapnim01
 - ddc – ddcapnim01
 - EGATE Disaster Recovery running on ddcapnim01
- NIM Alternate Master Servers
 - None

NIM Server Resources

- The following is a partial list of resources currently configured and available on CGE's NIM servers:
 - AIX
 - Linux
 - mksysb Repository
 - AIX Maintenance Levels
 - AIX APAR's
 - AIX eFixes
 - HACMP
 - MQ Series
 - Tivoli Storage Manager

NIM Server Resources (continued)

- NIM Resources Continued
 - Hitachi Software
 - Performance Monitoring Toolkit
 - freeware
 - Open Source Software
 - Linux Toolbox for AIX
 - Disaster Recovery hub for EGATE

NIM Server Operations

- The following is a partial list of operations currently configured and being performed on CGE's NIM servers:
 - Network boot server
 - AIX operating system installation
 - AIX operating system maintenance level updates
 - AIX operating system APAR updates
 - AIX operating system eFix updates
 - AIX mksysb repository
 - AIX mksysb installation

NIM Server Operations (continued)

- Operations currently configured and being performed on CGE's NIM servers:
 - AIX alt-clone installation
 - AIX alt-clone maintenance level updates
 - AIX alt-disk installation
 - A component of EGATE DR
 - Linux Installation
 - Linux rpm updates
 - Oracle database installation
 - Application installation and updates
 - Script server

NIM Server Operations (continued)

- EGATE Disaster recovery operations currently configured and being performed on CGE's NIM servers:
 - DR information gathering
 - DR information distribution
 - DR automated documentation generator

NIM Server Structure

- NIM Server Resources are separated into numerous resource classes
- Each resource class will have multiple elements and the storage location for each of these elements may require further subdivision
- The purpose of the subdivision is to create a logical and manageable hierarchy within the NIM structure
- There are two distinct areas of definition of a resource class
 - Resource class instance name
 - NIM Server identification
 - Resource location
 - File system identification

Resource Class

- The resource class is a NIM construct to identify the various types of resources. Some of the resources currently implemented by the CGE NIM Servers are:
 - **spot**: Shared Product Object Tree
 - **lpp_source**: source device for optional product images
 - **bosinst_data**: config file used during BOS install
 - **image_data**: config file used during BOS install
 - **mksysb**: backup images of the rootvg
 - **script**: executable files that are executed on a client
 - **resolv_conf**: config file for DNS resolution
- Many other resource classes exist

Resource Class (continued)

- Multiple instances of a resource class exist for the purpose of storing multiple instances of a resource such as versions of AIX
- Each instance of a resource class requires a directory and/or file structure
- The directory/file structure is referred to in NIM as the Resource Location
- The resource location has been standardized for the purpose of consistency and order
- The top level directory for all NIM resource classes is:
 - /export

Resource Class (continued)

- The resource location for each resource class begins as a subdirectory under “/export” with a name that corresponds with the resource class
 - **/export/spot**: Shared Product Object Tree
 - **/export/lpp_source**: source device for optional product images
 - **/export/bosinst_data**: config file used during BOS install
 - **/export/image_data**: config file used during BOS install
 - **/export/mksysb**: backup images of the rootvg
 - **/export/script**: executable files that are executed on a client
 - **/export/resolv_conf**: config file for DNS resolution

Resource Class bosinst_data

- Example instances of the resource class “bosinst_data”
 - bosinst_data: Default
 - /export/bosinst_data/bosinst_data
 - bosinst_data_noprompt: Unprompted installation
 - /export/bosinst_data/bosinst_data_noprompt
 - bosinst_data_4330: AIX 4.3.3.0 installation
 - /export/bosinst_data/bosinst_data_4330
 - bosinst_data_5200: AIX 5.2.0.0 installation
 - /export/bosinst_data/bosinst_data_5200
 - bosinst_data_5200-05: AIX 5.2.0.0 ML5 installation
 - /export/bosinst_data/bosinst_data_5200-05

Resource Class image_data

- Example instances of the resource class “image_data”
 - image_data: Default
 - /export/image_data/image_data
 - image_data_noprompt: Unprompted installation
 - /export/image_data/image_data_noprompt
 - image_data_4330: AIX 4.3.3.0 installation
 - /export/image_data/image_data_4330
 - image_data_5200: AIX 5.2.0.0 installation
 - /export/image_data/image_data_5200
 - image_data_5200-05: AIX 5.2.0.0 ML5 installation
 - /export/image_data/image_data_5200-05

Resource Class resolv_conf

- Example instances of the resource class “resolv_conf”
 - resolv_conf: Default
 - /export/resolv_conf/resolv_conf
 - resolv_conf_ddc: DNS resolution for DDC
 - /export/resolv_conf/resolv_conf_ddc
 - resolv_conf_mdc: DNS resolution for MDC
 - /export/resolv_conf/resolv_conf_mdc

Resource Class spot

- Example instances of the resource class “spot”
 - aixspot_4330: AIX 4.3.3.0 bootable image
 - /export/spot/aixspot_4330
 - aixspot_4330-11: AIX 4.3.3.0 ML11 bootable image
 - /export/spot/aixspot_4330-11
 - aixspot_5200: AIX 5.2.0.0 bootable image
 - /export/spot/aixspot_5200
 - aixspot_5200-05: AIX 5.2.0.0 ML5 bootable image
 - /export/spot/aixspot_5200-05

Resource Class mksysb

- Example instances of the resource class “mksysb”
 - mksysb_ddcaega01: bootable image of ddcaega01
 - /export/mksysb/mksysb_ddcaega01
 - mksysb_ddcaega02: bootable image of ddcaega02
 - /export/mksysb/mksysb_ddcaega02
 - mksysb_mdctxuapp80_20050412: bootable image of mdctxuapp80 on April 12, 2005
 - /export/mksysb/mksysb_mdctxuapp80_20050412
 - mksysb_mdctxuapp80_20050414: bootable image of mdctxuapp80 on April 14, 2005
 - /export/mksysb/mksysb_mdctxuapp80_20050412

Resource Class lpp_source

- The top level directory location to be used for storage of these resources will be "/export/lpp_source".
- Software filesets and updates for many different types of software are classified as "lpp_source"
- The storage location of these resources will be further divided into subdirectories
 - aix
 - hacmp
 - hitachi
 - etc

Resource Class lpp_source/aix

- The resource location for AIX related “lpp_source” resources is the directory “/export/lpp_source/aix”
- Many different types of resources are stored at this directory location
- The storage location of these resources will be further divided into categories identifying the resource type
 - aix: AIX operating system
 - aixdoc: AIX documentation
 - dev: AIX device drivers
 - expack: AIX expansion pack
 - plm: Partition Load Manager
 - vio: Virtual I/O Server

Resource Class lpp_source/aix

- Example AIX instances of the “lpp_source” resource class:
 - aix_4330: AIX 4.3.3.0 base level operating system
 - /export/lpp_source/aix/aix_4330
 - aix_5200-05: AIX 5.2.0.0 ML 5 operating system
 - /export/lpp_source/aix/aix_5200-05
 - dev_5200: AIX 5.2.0.0 device drivers
 - /export/lpp_source/aix/dev_5200
 - exppack_5200: AIX 5.2.0.0 expansion pack
 - /export/lpp_source/aix/exppack_5200
 - plm_1100: Partition Load Manager 1.1
 - /export/lpp_source/aix/plm_1100
 - vio_1100: Virtual I/O Server 1.1
 - /export/lpp_source/aix/vio_1100

Resource Class lpp_source/hacmpes

- Example HACMP ES instances of the “lpp_source” resource class:
 - hacmpes_4400: HACMP ES 4.4.0.0
 - /export/lpp_source/hacmpes/hacmpes_4400
 - hacmpes_4410-01: HACMP ES 4.4.1.0 ML1
 - /export/lpp_source/hacmpes/hacmpes_4410-01
 - hacmpes_4500: HACMP ES 4.5.0.0
 - /export/lpp_source/hacmpes/hacmpes_4500
 - hacmpes_5200: HACMP ES 5.2.0.0
 - /export/lpp_source/hacmpes/hacmpes_5200
 - hacmpes_5200-01: HACMP ES 5.2.0.0 ML1
 - /export/lpp_source/hacmpes/hacmpes_5200-01

Resource Class lpp_source/hitachi

- The resource location for Hitachi related “lpp_source” resources is the directory “/export/lpp_source/hitachi”
- Many different types of resources are stored at this directory location
- The storage location of these resources will be further divided into categories identifying the resource type
 - aixodm: Hitachi's AIX ODM software
 - dlm: DLM software
 - hdln: HDLM software
 - hdsmpio: Hitachi's Multi-path I/O software
 - lunstat: Hitachi's Performance Monitoring software

Resource Class lpp_source/hitachi

- Example Hitachi instances of the “lpp_source” resource class:
 - aixodm_5000: AIX ODM 5000
 - /export/lpp_source/hitachi/aixodm_5000
 - dlm_2430: DLM driver software
 - /export/lpp_source/hitachi/dlm_2430
 - hdlm_5251: HDLM driver software
 - /export/lpp_source/hitachi/hdlm_5251
 - hdsmpio_5400: Hitachi Multi-path I/O driver
 - /export/lpp_source/hitachi/hdsmpio_5400
 - lunstat_1220: Hitachi performance monitoring software
 - /export/lpp_source/hitachi/lunstat_1220

NIM Server Standards

- NIM, within the CGE environment is the required starting point for all software and OS installation and updates.
 - Each NIM Server will require any above updates “prior” to installation on any server.
- Further in depth information is available from the following URL:
 - <http://eperf.tu.com/GlobalSysAdmin/AIX/nimdoc.shtml>
- NIM From A to Z in AIX 4.3
 - <http://www.redbooks.ibm.com/>

Q&A