The Object Data Manager (ODM)
Unit Objectives

After completing this unit, you should be able to:

● Describe the structure of the ODM

● Use the ODM command line interface

● Explain the role of the ODM in device configuration

● Describe the function of the most important ODM files
What Is the ODM?

- The Object Data Manager (ODM) is a database intended for storing system information.

- Physical and logical device information is stored and maintained through use of objects with associated characteristics.
Data Managed by the ODM

- Devices
- Software
- System Resource Controller
- SMIT Menus
- TCP/IP Configuration
- Error Log, Dump
- NIM
### ODM Components

<table>
<thead>
<tr>
<th>uniquetype</th>
<th>attribute</th>
<th>deflt</th>
<th>values</th>
</tr>
</thead>
<tbody>
<tr>
<td>tape/scsi/scsd</td>
<td>block_size</td>
<td>none</td>
<td>0-2147483648,1</td>
</tr>
<tr>
<td>disk/scsi/osdisk</td>
<td>pvid</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>tty/rs232/tty</td>
<td>login</td>
<td>disable</td>
<td>enable, disable, ...</td>
</tr>
</tbody>
</table>
## ODM Database Files

<table>
<thead>
<tr>
<th>Category</th>
<th>Files</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predefined device information</strong></td>
<td>( PdDv, PdAt, PdCn )</td>
</tr>
<tr>
<td><strong>Customized device information</strong></td>
<td>( CuDv, CuAt, CuDep, CuDvDr, CuVPD, Config_Rules )</td>
</tr>
<tr>
<td>Software vital product data</td>
<td>history, inventory, lpp, product</td>
</tr>
<tr>
<td>SMIT menus</td>
<td>( \text{sm_menu_opt, sm_name_hdr, sm_cmd_hdr, sm_cmd_opt} )</td>
</tr>
<tr>
<td>Error log, alog, and dump information</td>
<td>( \text{SWservAt} )</td>
</tr>
<tr>
<td>System Resource Controller</td>
<td>( \text{SRCsubsys, SRCsubsvr, ...} )</td>
</tr>
<tr>
<td>Network Installation Manager (NIM)</td>
<td>( \text{nim_attr, nim_object, nim_pdattr} )</td>
</tr>
</tbody>
</table>
Device Configuration Summary

Predefined Databases
- PdCn
- PdDv
- PdAt

Customized Databases
- CuDep
- CuDvDr
- CuDv
- CuAt
- CuVPD

Config_Rules

Configuration Manager (cfgmgr)
Configuration Manager

Predefined
- PdDv
- PdAt
- PdCn

"Plug and Play"

Customized
- CuDv
- CuAt
- CuDep
- CuDvDr
- CuVPD

Methods
- Define
- Configure
- Change
- Unconfigure
- Undefine

Device Driver

Config_Rules

Load
Unload
Location and Contents of ODM Repositories

CuDv
CuAt
CuDep
CuDvDr
CuVPD
Config_Rules

history
inventory
lpp
product

nim_*
SWservAt
SRC*

PdDv
PdAt
PdCn

history
inventory
lpp
product

sm_*

history
inventory
lpp
product

Network

/etc/objrepos
/usr/lib/objrepos
/usr/share/lib/objrepos

© Copyright IBM Corporation 2007
How ODM Classes Act Together

PdDv:
  type = "14106902"
  class = "adapter"
  subclass = "pci"
  prefix = "ent"

  DvDr = "pci/goentdd"
  Define = /usr/lib/methods/define_rspc"
  Configure = "/usr/lib/methods/cfggoent"

  uniquetype = "adapter/pci/14106902"

CuDv:
  name = "ent1"
  status = 1
  chgstatus = 2
  ddins = "pci/goentdd"
  location = "02-08"
  parent = "pci2"
  connwhere = "8"

  PdDvLn = "adapter/pci/14106902"

PdAt:
  uniquetype = "adapter/pci/14106902"
  attribute = "jumbo_frames"
  deflt = "no"
  values = "yes,no"

  chdev -l ent1 \
  -a jumbo_frames=yes

CuAt:
  name = "ent1"
  attribute = "jumbo_frames"
  value = "yes"
  type = "R"
Data Not Managed by the ODM

Filesystem information

User/Security information

Queues and Queue devices
Let’s Review:
Device Configuration and the ODM

1. 

Undefined

Defined

Available

2.  

3.  

D____ D____

4.  

/_____/_____

AIX Kernel

Applications

D____ D____

/_____/_____

© Copyright IBM Corporation 2007
ODM Commands

Object class: odmcreate, odmdrop

Descriptors: odmshow

<table>
<thead>
<tr>
<th>uniquetype</th>
<th>attribute</th>
<th>deflt</th>
<th>values</th>
</tr>
</thead>
<tbody>
<tr>
<td>tape/scsi/scsd</td>
<td>block_size</td>
<td>none</td>
<td>0-2147483648,1</td>
</tr>
<tr>
<td>disk/scsi/osdisk</td>
<td>pvid</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>tty/rs232/tty</td>
<td>login</td>
<td>disable</td>
<td>enable, disable, ...</td>
</tr>
</tbody>
</table>

Objects: odmadd, odmchange, odmdelete, odmget
changing attribute values

# odmget -q"uniquetype=tape/scsi/scsd and attribute=block_size" PdAt > file
# vi file

PdAt:
uniquetype = "tape/scsi/scsd"
attribute = "block_size"
deflt = "512"
values = "0-2147483648,1"
width = ""
type = "R"
generic = "DU"
rep = "nr"
nls_index = 6

Modify deflt to 512

# odmdelete -o PdAt -q"uniquetype=tape/scsi/scsd and attribute=block_size"
# odmadd file
Using `odmchange` to Change Attribute Values

```bash
# odmget -q"uniquetype=tape/scsi/scsd and attribute=block_size" PdAt > file

# vi file

PdAt:
  uniquetype = "tape/scsi/scsd"
  attribute = "block_size"
  deflt = "512"
  values = "0-2147483648,1"
  width = ""
  type = "R"
  generic = "DU"
  rep = "nr"
  nls_index = 6

Modify deflt to 512

# odmchange -o PdAt -q"uniquetype=tape/scsi/scsd and attribute=block_size" file
```
Software Vital Product Data

lpp:
  name = "bos.rte.printers"
  size = 0
  state = 5
  ver = 6
  rel = 1
  mod = 0
  fix = 0
  description = "Front End Printer Support"
  lpp_id = 38

product:
  lpp_name = "bos.rte.printers"
  comp_id = "5765-C3403"
  state = 5
  ver = 6
  rel = 1
  mod = 0
  fix = 0
  ptf = ""
  prereq = "*coreq bos.rte 5.1.0.0"
  description = ""
  supersedes = ""

inventory:
  lpp_id = 38
  private = 0
  file_type = 0
  format = 1
  loc0 = "/etc/qconfig"
  loc1 = ""
  loc2 = ""
  size = 0
  checksum = 0

history:
  lpp_id = 38
  ver = 6
  rel = 1
  mod = 0
  fix = 0
  ptf = ""
  state = 1
  time = 1187714064
  comment = ""
# Software States You Should Know About

<table>
<thead>
<tr>
<th>State</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applied</strong></td>
<td>• Only possible for PTFs or Updates&lt;br&gt;• Previous version stored in <code>/usr/lpp/Package_Name</code>&lt;br&gt;• <em>Rejecting</em> update recovers to saved version&lt;br&gt;• <em>Committing</em> update deletes previous version</td>
</tr>
<tr>
<td><strong>Committed</strong></td>
<td>• Removing committed software is possible&lt;br&gt;• No return to previous version</td>
</tr>
<tr>
<td><strong>Applying,</strong></td>
<td>If installation was not successful:&lt;br&gt;• <code>installp -C</code>&lt;br&gt;• <code>smit maintain_software</code>&lt;br&gt;<strong>Committing,</strong></td>
</tr>
<tr>
<td><strong>Broken</strong></td>
<td>• Cleanup failed&lt;br&gt;• Remove software and reinstall</td>
</tr>
</tbody>
</table>
Predefined Devices (PdDv)

PdDv:
   type = "scsd"
   class = "tape"
   subclass = "scsi"
   prefix = "rmt"
   ...
   base = 0
   ...
   detectable = 1
   ...
   led = 2418

   setno = 54
   msgno = 0
   catalog = "devices.cat"

DvDr = "tape"

Define = "/etc/methods/define"
Configure = "/etc/methods/cfgsctape"
Change = "/etc/methods/chggen"
Unconfigure = "/etc/methods/ucfgdevice"
Undefine = "/etc/methods/undefine"
Start = ""
Stop = ""
...
uniquetype = "tape/scsi/scsd"
Predefined Attributes (PdAt)

PdAt:
  uniquetype = "tape/scsi/scsd"
  attribute = "block_size"
  deflt = ""
  values = "0-2147483648,1"
...

PdAt:
  uniquetype = "disk/scsi/osdisk"
  attribute = "pvid"
  deflt = "none"
  values = ""
...

PdAt:
  uniquetype = "tty/rs232/tty"
  attribute = "term"
  deflt = "dumb"
  values = ""
...

Customized Devices (CuDv)

CuDv:
name = "ent1"
status = 1
chgstatus = 2
ddins = "pci/goentdd"
location = "02-08"
parent = "pci2"
connwhere = "8"
PdDvLn = "adapter/pci/14106902"

CuDv:
name = "hdisk2"
status = 1
chgstatus = 2
ddins = "scdisk"
location = "01-08-01-8,0"
parent = "scsi1"
connwhere = "8,0"
PdDvLn = "disk/scsi/scsd"
Customized Attributes (CuAt)

CuAt:

    name = "ent1"
    attribute = "jumbo_frames"
    value = "yes"

... 

CuAt:

    name = "hdisk2"
    attribute = "pvid"
    value = "00c35ba0816eafe50000000000000000000000000"

...
## Additional Device Object Classes

<table>
<thead>
<tr>
<th>PdCn:</th>
<th>CuDvDr:</th>
</tr>
</thead>
<tbody>
<tr>
<td>uniquetype =</td>
<td>resource = &quot;devno&quot;</td>
</tr>
<tr>
<td>&quot;adapter/pci/sym875&quot;</td>
<td>value1 = &quot;36&quot;</td>
</tr>
<tr>
<td>connkey = &quot;scsi&quot;</td>
<td>value2 = &quot;0&quot;</td>
</tr>
<tr>
<td>connwhere = &quot;1,0&quot;</td>
<td>value3 = &quot;hdisk3&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CuDvDr:</th>
</tr>
</thead>
<tbody>
<tr>
<td>resource = &quot;devno&quot;</td>
</tr>
<tr>
<td>value1 = &quot;36&quot;</td>
</tr>
<tr>
<td>value2 = &quot;0&quot;</td>
</tr>
<tr>
<td>value3 = &quot;hdisk3&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CuDep:</th>
<th>CuVPD:</th>
</tr>
</thead>
<tbody>
<tr>
<td>name = &quot;rootvg&quot;</td>
<td>name = &quot;hdisk2&quot;</td>
</tr>
<tr>
<td>dependency = &quot;hd6&quot;</td>
<td>vpd_type = 0</td>
</tr>
<tr>
<td></td>
<td>vpd = &quot;*MFIBM \n</td>
</tr>
<tr>
<td></td>
<td>HUS151473VL3800 \n</td>
</tr>
<tr>
<td></td>
<td>*F03N5280 \n</td>
</tr>
<tr>
<td></td>
<td><em>RL53343341</em>SN009DAFDF*ECH17</td>
</tr>
<tr>
<td></td>
<td>923D *P26K5531 *Z0\n</td>
</tr>
<tr>
<td></td>
<td>000004029F00013A*ZVMPPSS43A</td>
</tr>
<tr>
<td></td>
<td>*Z20068Z307220&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CuDep:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>name = &quot;datavg&quot;</td>
<td></td>
</tr>
<tr>
<td>dependency = &quot;lv01&quot;</td>
<td></td>
</tr>
</tbody>
</table>

© Copyright IBM Corporation 2007
Checkpoint

1. In which ODM class do you find the physical volume IDs of your disks?
   ________________________________________________________________

2. What is the difference between state defined and available?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
1. In which ODM class do you find the physical volume IDs of your disks?
   
   **CuAt**

2. What is the difference between state defined and available?

   When a device is defined, there is an entry in ODM class **CuDv**. When a device is available, the device driver has been loaded. The device driver can be accessed by the entries in the `/dev` directory.
Exercise 2: The Object Data Manager (ODM)

- Review of device configuration ODM classes
- Role of ODM during device configuration
- Creating self-defined ODM classes (Optional)
Unit Summary

- The ODM is made from object **classes**, which are broken into individual **objects** and **descriptors**
- AIX offers a **command line interface** to work with the ODM files
- The **device information** is held in the **customized** and the **predefined** databases (Cu*, Pd*)