New Features of the BRL-CAD Database Format

Lee A. Butler
New Database Outline

• Introduction & Upgrading
• Machine Independence
• Attributes
• New ASCII form
• Binary objects
• Hiding
• Unlimited length names
• Neu-Speak terms
Introduction

• New format introduced in Release 6.0
• mged will edit either old or new format
  – Note that new capabilities only work on new version databases
• New format is more compact than previous version
• New capabilities for storing attributes and arbitrary data.
Databases Are Smaller Now

Objects are no longer stored in 128-byte *granules*

<table>
<thead>
<tr>
<th>Model</th>
<th>Size (Mbytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rel. 5.x</td>
</tr>
<tr>
<td>A-10</td>
<td>12.5</td>
</tr>
<tr>
<td>CH-47D</td>
<td>5.8</td>
</tr>
<tr>
<td>LAV 3R</td>
<td>107.0</td>
</tr>
<tr>
<td>M60A3</td>
<td>2.5</td>
</tr>
<tr>
<td>SCUD</td>
<td>6.5</td>
</tr>
<tr>
<td>T-72 M1</td>
<td>4.1</td>
</tr>
</tbody>
</table>
Upgrading

• The *dbupgrade* command creates a new database in the new format from an existing database.
  – Usage: dbupgrade old.g new.g5

• *Users should convert databases as soon as possible.*
  – Old format remains machine-specific
  – Old format does not support new features such as attributes
Machine Independent

- All floating point stored in big-endian IEEE double precision.
  - More accurate geometry
  - Larger geometry possible
  - On-disk units are still in millimeters

- Integers stored as big-endian
  - In 16-, 32-, and 64-bit representations
Attributes

- Associate arbitrary text data with any object
- Some attribute names already reserved/in-use:
  - MUVES_Component
  - Comment
  - Traditional region flags: region_id, los air_code
Simple Uses of Attributes

```
mged> attr set piston3.r comment "is material right?"
mged> attr set piston3.r RoleModel Elvis
mged> attr get piston3.r comment
  is material right?
mged> attr get piston3.r
  comment {is material right?} RoleModel {Elvis}
mged> attr set piston3.r MUVES_Component engine
mged> attr set ember rgb [glow [attr ember get T]]
mged> db adjust sphere V [attr get sphere posn(5)]
mged>
```
New ASCII Form

- Optimized for processing with Tcl command interpreter

- Note: special “bwish” and “btclsh” versions of interpreters
  - Contain BRL-CAD extensions to the interpreter
Binary Objects

- Store arbitrary information in a database object.
  - Textures
  - Dsp data for “height fields”
  - User data
    - Pro/E database
    - Reports
Hidden Objects

• The mged “hide” command will remove object from “ls” displays
  – note: ls -a shows ALL objects, even hidden ones

• The mged “unhide” command will make object visible again
New Database Object

- Called _GLOBAL
- Stores database global information such as units, tolerances, title, etc.
- Ordinarlily “hidden”
- Auto-recreated if it is ever deleted
  - Of course, old values are lost
Neu-Speak

• Some changes in terminology:
  – “Primitive Shape” not “Solid”
    • Originally, BRLCAD supported only platonic solids
  – “Assembly Combination” not “Group”
    • No database object called group.
    • A special “comb” command that inserted “u” operators for you
Thank you

Lee A. Butler
butler@arl.army.mil
410 278 9200