

# Recovering from Boot Failures

The HP-UX boot procedure,  
possible failures,  
and recovery techniques.

HP9000: HP-UX 10.x and 11.x

# Overview - steps to a successful boot

- Boot area
- LVM structures
- /stand or root file system
- Kernel file
- Start-up scripts, commands, and configuration files

# Overview of failures

- Hardware failures
- Data
  - Corrupted
  - Invalid
  - Missing
  - Bad changes without immediate effect

# Overview of recovery - Objective

- Identify the failure
- Work around the failure to get the system up the best way possible
- Get access to the boot disk
- Rewrite or correct the data

# Overview of recovery - Bad boot area

- Boot from a different device
  - LVM mirror disk
  - Support/Recovery CD
  - Rewrite boot area using mkboot(1M)
- Ignite/UX make-recovery tape

# Overview of recovery - LVM errors

- Quorum failure in vg00
  - Use boot option “-lq” to bypass quorum check
- LVM failure in boot or root lvol
  - Use boot option “-lm” (LVM maintenance mode) to bypass LVM integrity checks

# Overview of recovery - File system errors

- fsck(1M) runs automatically
- Can be run manually if needed

# Overview of recovery - Bad or missing kernel

- Boot a different kernel file
- Backup kernel file is /stand/vmunix.prev
- Boot from Support/Recovery CD and download a small recovery kernel



# Overview of recovery - Start-up script problems

- System hang during a start-up script
  - Press “break” or Shift-Ctrl-pipe
  - Remaining start-up scripts are skipped
  - Console login
  - File systems are already mounted
- Error during a start-up script
  - Boot into a lower run level or single-user mode

# System start-up sequence

- Bootrom
  - PDC (processor-dependent code)
- Loader utilities
  - From the boot area of disk
  - LIF (Logical Interchange Format)
  - isl (initial system loader)
  - hpux (secondary loader for HP-UX)
- HP-UX

# Bootrom start-up sequence

- Hardware selftests
- Initialize I/O interfaces
- Autosearch/autoboot from stored boot path
  - or attended mode (your input from keyboard)
- Load isl from boot area

# Bootrom -

failure to read the boot device

- IODC (I/O dependent code)
- ENTRY\_INIT status codes

# Bootrom -

I/O succeeds, but data is bad

- Validity check on boot area
- Validity check on isl

# Loader utilities

- isl
- hpux

```
ISL> hpux [-i<run-level>] [<kernel file>]
```

```
ISL> hpux [-lq] [<kernel file>]
```

```
ISL> hpux [-lm] [<kernel file>]
```

# Loading the kernel

- Infamous message “# + # + #”

# Failure to load the kernel

- “/stand/vmunix: cannot find or not executable”



# HP-UX Start-up Sequence

- Initialize system hardware and devices
- Initialize HP-UX data structures and interfaces
- Find, check, and mount root file system
- Start the init process

# /sbin/init runs items from /etc/inittab

- initdefault run level
- /sbin/ioinitrc
- /sbin/bcheckrc
- /sbin/rc
- /usr/sbin/getty

# /sbin/fsck failures

- Messages report file systems that failed
- /sbin/bcheckrc spawns a shell for you to run fsck manually
- Fix specific file systems or all file systems
- Exit to resume the boot procedure

# /sbin/rc runs the start-up scripts

- New scheme as of HP-UX 10.0
- Scripts in /sbin/init.d
- Variables in /etc/rc.config.d
- Execution control based on sorted links in /sbin/rc#.d directories, one for each run level
- Messages are logged in /etc/rc.log

# “init: command is respawning too rapidly”

- Serious error in script or configuration file
- Boot into single-user mode
- Mount /usr, /tmp, /var
- Troubleshoot
  - Find and fix recent changes
  - “/usr/bin/ksh -x /sbin/rc” to see error message

# Console login

- Terminals use `/usr/sbin/getty`
- Graphics consoles may use
  - CDE (Common Desktop Environment)
  - HP VUE (Visual User Environment)
- If CDE or VUE hang
  - use failsafe login or lower run level

# Alternate boot sources

- Mirror boot disk
- Support/Recovery CD
- Ignite-UX
  - reinstall
  - recover

# Support media history

- Part of “Software Media”
- Called “Support” tape or CD
- Bootable - basic kernel
  - offline hardware diagnostics
  - recovery utilities
- No Response Center support



## 10.20 Recovery CD

- Recovery functions made “menu-easy”
- Diags and Recovery CDs separated as of February 1998
- Detailed usage instructions in Appendix C. Support Media Guide

# 11.0 - no Support/Recovery CD

- Install and recovery on one CD
- Called “Install” CD
- Similar in functions to 10.20 menus
- Detailed usage instructions in Appendix C.  
Support Media Guide

# Ultimate boot failure recovery

## - reinstall

- Can be acceptable recovery
- Can be efficient
- Standard procedure
  - Predictable times
  - Known good results
  - Supported and guaranteed

# Ignite-UX

- HP's new software installation tool
- Client-server network install, or local
- Standard or customized install
- Golden image
- `make_recovery`