Customer Experience – Itanium Port

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Abstract

JCC has been testing the difficulty of an Itanium port since July 2004. Given that we've been testing our own port while the underlying software has been in development and field test, the number of difficulties encountered have been modest.

Agenda

- What VMS looks like on IPF

- What Rdb and CDD look like on IPF

- A bit about the JCC Development Environment

- Porting the JCC LogMiner Loader

- Porting a complex business application

- Issues encountered

The IPF Boot Menu

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 2.21 [4334]

Please select a boot option

    JCC Consulting, INC EFT 8.2
    JCC Consulting, EFT 8.2 Conversational boot
    Boot Option Maintenance Menu
    System Configuration Menu


Use ^ and v to change option(s). Use Enter to select an option
```

Shutdown

```
%NET$SHUTDOWN-I-SHUTENTITY, shutting down ROUTING
%NET$SHUTDOWN-I-SHUTENTITY, shutting down X25
%NET$SHUTDOWN-I-SHUTENTITY, shutting down WANDD
%NET$SHUTDOWN-I-SHUTENTITY, shutting down SESSION CONTROL APPLICATION *
%NET$SHUTDOWN-I-SHUTENTITY, shutting down DTSS
%NET$SHUTDOWN-I-SHUTENTITY, shutting down DNS CLERK
%NET$SHUTDOWN-I-SHUTENTITY, shutting down DECdns
%SHUTDOWN-I-STOPQUEUES, the queues on this node will now be stopped

%SHUTDOWN-I-SITESHUT, the site-specific shutdown procedure will now be invoked
Shutting down the Oracle Rdb monitor (RDMS_MONITOR72)
%SHUTDOWN-I-STOPUSER, all user processes will now be stopped
%SHUTDOWN-I-STOPAUDIT, the security auditing subsystem will now be shut down
%SHUTDOWN-I-STOPSMISRV, the SMI server will now be shut down
%SHUTDOWN-I-STOPSECSRV, the security server will now be shut down
%SHUTDOWN-I-REMOVE, all installed images will now be removed
%SHUTDOWN-I-DISMOUNT, all volumes will now be dismounted
        SYSTEM SHUTDOWN COMPLETE



**** Primary HALTED with code HWRPB_HALT$K_REMAIN_HALTED

****  Hit any key to cold reboot   ****
P00>>>
```

VMS

```
Itanium  Server JASON at JCC, Authorized use only permitted

Username: system
Password:
   HP OpenVMS Industry Standard 64 Operating System, Version XALQ-T3Z on node JA
SON
    Last interactive login on Tuesday, 23-NOV-2004 08:31:09.28
    Last non-interactive login on Wednesday, 24-NOV-2004 09:58:57.82
Current SYSTEM Oracle Rdb environment is version T7.2-010 (MULTIVERSION)
jason >
```

VMS

```
 Pid       Process Name     State  Pri      I/O        CPU        Page flts   Pages
OpenVMS XALQ-T3Z   on node JASON   24-NOV-2004 13:52:56.13   Uptime   1 17:23:25
 Pid       Process Name     State  Pri      I/O        CPU        Page flts   Pages
22A00401 SWAPPER          HIB    16       0    0 00:00:07.02          0          0
22A00407 CLUSTER_SERVER   HIB    13      12    0 00:00:00.23        110        153
22A00408 SHADOW_SERVER    HIB     6       7    0 00:00:00.00        130        230
22A00409 CONFIGURE        HIB    10      15    0 00:00:00.00         84         93
22A0040A USB$UCM_SERVER   HIB     6     227    0 00:00:00.07        279        413
22A0040B LANACP           HIB    13      59    0 00:00:00.02        209        279
22A0040D IPCACP           HIB    10       9    0 00:00:00.00         84        123
22A0040E ERRFMT           HIB     8    6303    0 00:00:00.33        237        303
22A0040F CACHE_SERVER     HIB    16       2    0 00:00:00.00         61         83
22A00410 OPCOM            HIB     8     579    0 00:00:00.32        285        122
22A00411 AUDIT_SERVER     HIB    10      78    0 00:00:00.03        190        266
22A00412 JOB_CONTROL      HIB    10     113    0 00:00:00.07        130        198
22A00415 SECURITY_SERVER  HIB    10     627    0 00:00:00.21        490        706
22A00417 DNS$ADVER        LEF     5   29048    0 00:00:01.98        914       1079
22A00418 LES$ACP_V30      HIB     8     133    0 00:00:00.01        134        174
22A00419 NET$ACP          HIB     6      77    0 00:00:00.02        286        358
22A0041A REMACP           HIB     8       9    0 00:00:00.00         65         70
22A0041B NET$EVD          HIB     6      36    0 00:00:00.03        341        647
22A0041C DTSS$CLERK       LEF    10     149    0 00:00:00.07        312        505
22A0041D SMISERVER        HIB     9      38    0 00:00:00.03        324        395
 RETURN/SPACE=More, PREV/NEXT=Scroll, INS/REM=Pan, SELECT=80/132, CTRL/Z=Quit
```

Look And Feel

- IPF system is integrated into the JCC Cluster
  - Three other systems running VMS 7.3-2
  - Most disks are mounted on all systems
  - Shared authorization and security files
- Seems and is managed just like any other VMS box

JCC Development Environment

- Each environment contains
  - A set of DCL procedures plus
  - CMS library
  - Logical name tables
  - MMS rules are shared across all environments
  - PCA library
  - Directories for objects, executables, shareable images and such
- Each environment implements the standard 4 levels (Development, Integration testing, Training and Production)

JCC Development Environment

- Each environment/level may reference others
  - At different levels to isolate development in one environment from development in others
- Implies precedence in building code
- For complex applications, we usually build one base shareable image
  - Contains common data needed by most programs
  - Includes Rdb database handles and such

Tailoring the Environment

- The environment context was already sensitive to architecture differences
  - write sys$output " "f$getsyi("ARCH_NAME")' "
    Alpha
  - write sys$output " "f$getsyi("ARCH_NAME")' "
    IA64

JCC Development Environment

- From the VAX to Alpha port
  - Different directories for targets of compiles & links
  - Different linking procedures for shareable images
- Were implemented by appending architecture values to various files, such as linker options files, in MMS Macros

Required Changes to Environment

- Alpha and IPF use identical linker options language
    - Had to suppress selection of IA64 options files
- C compilation options had to be changed to be consistent with the way the C code had been developed
    - For IPF we had to use
      warn=(info=protoscope*3*,noinfo)
    - For Alpha we used
      warn=(info=protoscope*2*,noinfo)

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Changes to Linker Procedures

- The new ELF [Extensible Linking Format] language does not provide for multiple initializations of different components of the same PSECT by different object models

- Result was that linking of the base image failed until we modified the compiles to initialize Rdb handles in only one module

Current Status

- JCC LogMiner Loader compiled and built [and ran] immediately.
  - Currently undergoing regression testing.
  - Itanium version does not support anything but Rdb and API targets at this point.
- The large [hundreds/thousands of modules] application still does not build completely [bugs rather than differences]
- But the Rdb database is merely an RMU/CONVERT

Comment From A JCC Developer

In some ways, this port was easier than the AXP port. We had a learning curve with that port that has helped with this one. – Tom Musson

Thanks to A Lot of People

- VMS Engineering for their early and very recent copies of the OS

- Compiler Engineers who supplied releases as we ran into bugs

- Rdb engineers who endured all kinds of strange & complicated TARs.

- CDD engineering who supplied updated kits and comments.

- Rdb support for processing all sorts of unexpected and odd TARs

Questions

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