#### SUPERDOME

#### High Availability Features "Inside the Box"

Julie J. Smith Information Technology Organization First Union Corporation

#### Introduction

First Union Corporation
Approximately 300 HP9000 servers
Main Objective: Server Consolidation
Early Market Seed Program (EMSP) Participant

#### Superdome

Superdome is HP's latest addition to the HP9000 family of servers HP-UX 11.i PA8600 RISC processor (552MHz) 2 to 64 processors • Up to 192 PCI slots Cell based architecture Hard Partitions

#### Agenda

List Hardware Configurations Discuss Complex Components and Modular Architecture Define Partitioning Discuss OnLine Addition and **Replacement (OLAR)** Define iCOD Discuss software functionality

#### Hardware Configurations

16 Way
32 Way
64 Way

#### **Complex Components**

CabinetGSPSMS

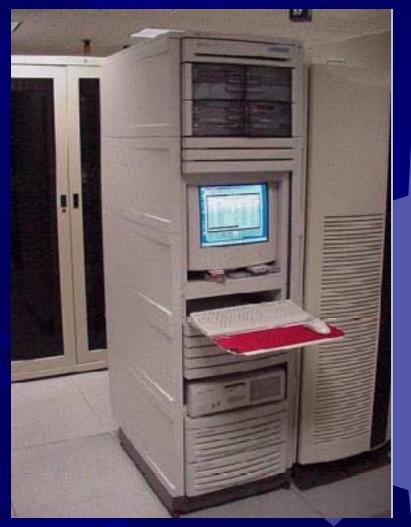
#### Cabinets

Left
Right
I/O Expansion



#### **GSP** and **SMS**

GSP is actually a board inside the Superdome Complex. Physical connection from terminal to GSP. SMS is a diagnostics workstation only. HP will use the SMS to service the Complex and perform firmware upgrades.



#### Modular Architecture

Cell
I/O Bay
I/O Chassis
Partition
Crossbar

#### **Cell Board**



Partitioning
 nPartitions
 Hard
 vPartitions
 Soft

#### Hard Partitions

Each partition has its own independent resources

CPU Memory I/O

#### Availability of Partitions

Partitions are independent of each other.

#### Example:

If there is a CPU failure, the partition comes down and deconfigures the processor, then boots back up. The Par doesn't stay down while the cell is repaired. This is true for CPU/memory/cell boards.

### Flexibility

Example:

Multiple independent environments can exist for applications, test, production environments or for applications that require different patch levels, etc.

**OLAR - Online Addition and Replacement of** I/O Components PCI I/O cards and chassis Per-slot power control Allows you to add a new card and replace an existing card without requiring a reboot

🔀 Cards (snoop	y)				_ 🗆 🗵
<u>F</u> ile <u>V</u> iew	u <u>O</u> ptions <u>A</u> ctions				<u>H</u> elp
I∕O Cards				1 of 42 se	lected
Slot	Hardware Path	Driver	State	Slot Power	I
0-0-1-2	2/0/2/0/0.34.27.255.1	fopdev	active	on	F A
0-0-1-3	2/0/3/0/0	c720	active	on	5
0-0-1-4	2/0/4/0/0	td	active	on	
0-0-1-5	2/0/6/0	-	-	off	e
0-0-1-6	2/0/14/0/0	gelan	active	on	- H
0-0-1-7	2/0/12/0/0	td	active	on	- H
0-0-1-8	2/0/11/0/0	c720	active	on	
0-0-1-9	2/0/10/0/0	td	active	on	- H
0-0-1-9	2/0/10/0/0,34	fop	active	on	F
0-0-1-9	2/0/10/0/0.34.23.19.0	foparray	active	on	F
0-0-1-9	2/0/10/0/0.34.23.19.1	foparray	active	on	F
0-0-1-9	2/0/10/0/0.34.23.255.1	fopdev	active	on	F
0-0-1-10	2/0/9/0/0	fddi4	active	on	E 🗸

#### Analyze Critical Resources (sneapy) - 0 -View SAH Log .... Critical Resource Analusis for slot 0-0-1-4; No affected resources are in use. Affected cards or ocrts; 2/0/4/0/0 : HP Tachyon TL/TS Fibre Channel Hass Storage Adapter Analysis Details Haes otorage norte evaluateds 2/0/4/0/0 to affected ports have an alternate path. Affected ports which are single points of failure: 2/0/4/0/0 Affected device files: /dev/646 No logical volumes are affected. No file systems are affected. No processes are affected. He affected devices are being used or will be used for swam. to affected devices are being used or will be used for curp. to network ports were evaluated. ill affected sorts were evaluated, Press [OK] when ready so turn off the slot, or [Cancel] to stop the operation. C-meel OK: Help

#### Replace Card (snoopy)

Remove the existing card, and insert the replacement. Before removing the card, confirm that the slot's green power LED is off, and that the amber attention LED is on.

Press [OK] when the new card is in place. The amber attention LED will be turned off, and the new card activated by resuming all ports suspended during the operation.

Press [Cancel] to leave the system in its current state. The amber attention LED will be turned off, but all ports suspended during the operation will remain suspended. The existing card may be removed and the new card inserted later. The suspended ports may be resumed with Actions->Bring On-Line...

Cancel

Superdome: High Availability Features "Inside the Box"

Help



## OLAR - Online Addition and Replacement of Cell Boards

When a dynamic kernel is available, the dynamic addition and deletion of cell boards will be supported.

## OLAR - Online Addition and Replacement of Partitions

## Partitions can be added without affecting the other partitions in the complex.

## iCOD - Instant Capacity on Demand

Access to additional CPU resources beyond what was originally purchased.
Availability Feature as well as Scalability.
In the future, dynamic resizing of partitions will be available.

#### Software Features

- Parmgr GUI based menus (like SAM).
   Has detailed logging facility that keeps track of all changes.
- Parcreate, parremove, parmodify, parstatus
- Rad Command line options for OLAR
  Frupower, fruled

#### Parmanager

Complex Name Maximus	MyComplex->Partition 0	(partit)				
Available Resources	Hardware Location	Actual Usage	CPU Status	Memory Status	Connected To	20
	cabl, callo	active core	2 decentig	ok	celet, bay I, cheeping	
	cab0. cell2 cab0. cell3	active	1 deconfig 2 deconfig	ok ok	cabil, bayo, chassis i	ye -
	abo, bayo, chassis1	active	-		cabo, cell2	74
	ab0, bay1, chassis3	active	-	-	ceb0, cello	ye
						1.00

#### Availability

Superdome is a "Highly Available" system, it is not Fault Tolerant.
Single Points of Failure (SPOF's)
FEPS
UGUY
HUCB
"MC Service Guard in a Box"

### Repairability

N+1 CPU's with iCOD
OLARable components
Hot-swap N+1 components
Fans
Power supplies
Backplane power converters

## Software that can Further Enhance Availability

HAO
EMS
PRM
SCM

#### Summary

Superdome Hardware Configurations
Cells
Partitions
OLAR
iCOD
Software Features

# References and Where to Go for More Information

- www.docs.hp.com
- Free Online Seminars offered on: http://education.itresourcecenter.hp.com
- http://www.hp.com/products1/unixservers/highend/su perdome/index.html
- Managing Superdome Complexes: A Guide for HP-UX System Administrators
- Superdome Installation Guide
- Instant Capacity on Demand (iCOD) Release Notes
- Planning Superdome Configurations Whitepaper

#### A Special Thanks to...

**Our local HP Account Team** 

**Superdome Response Center Engineers** 

#### **HP Engineering Team**