

# Building Active/Passive Clusters with Oracle Fusion Middleware 11g

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Technology & E-Business Suite 2010

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BUSINESS SYSTEMS INTEGRATION

# Simon Haslam / Veriton

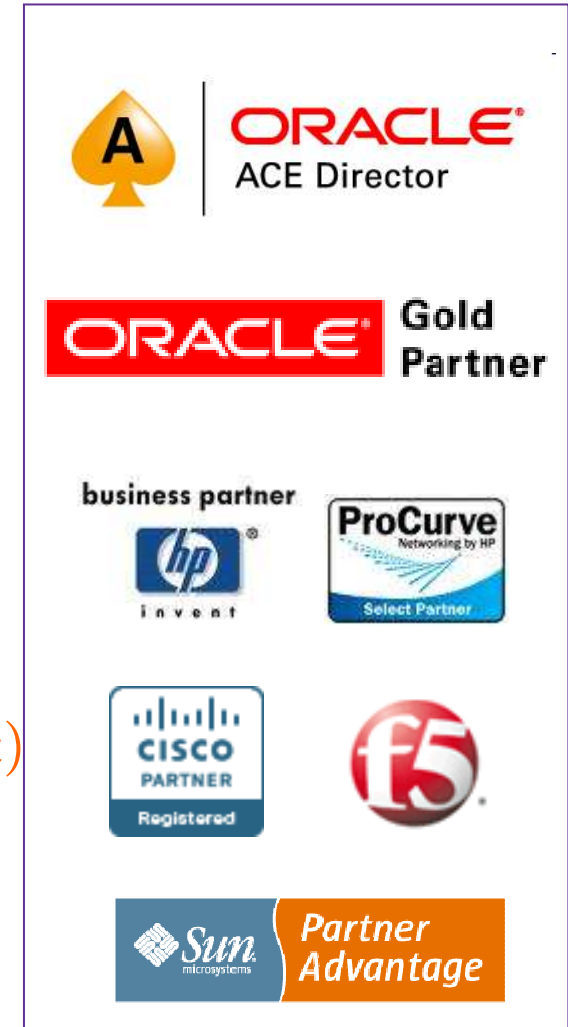
Specialised consultant & Oracle Partner,  
established for 14 years

Demanding **web & call-centre** applications

Architecture & development strategy;  
health-checks; disaster recovery; tuning

Oracle Fusion Middleware  
(clusters, J(2)EE, ADF, SSO, OID, Reports, etc)  
ADF Application (esp. strategy & admin)

Database & related technologies  
(OS, load balancers, firewalls, ...)



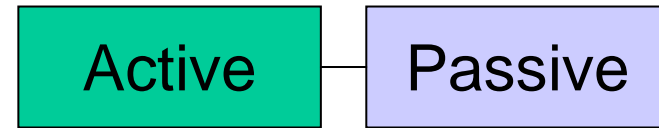
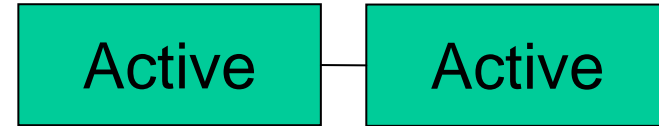
# Agenda

- ❶ CFC & High Availability Concepts
- ❷ Setting up Fusion Middleware 11g for CFC
- ❸ Installation Approach for ASCRS

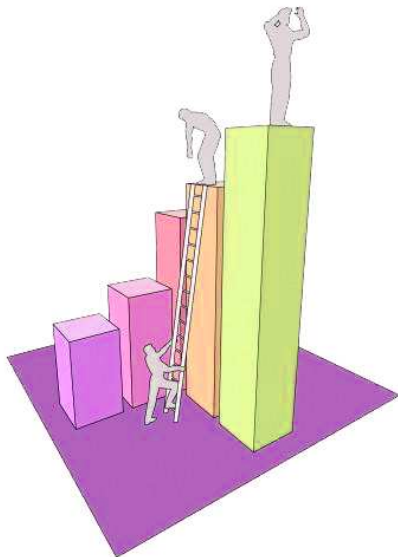
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# Why Cluster?

- Higher Availability

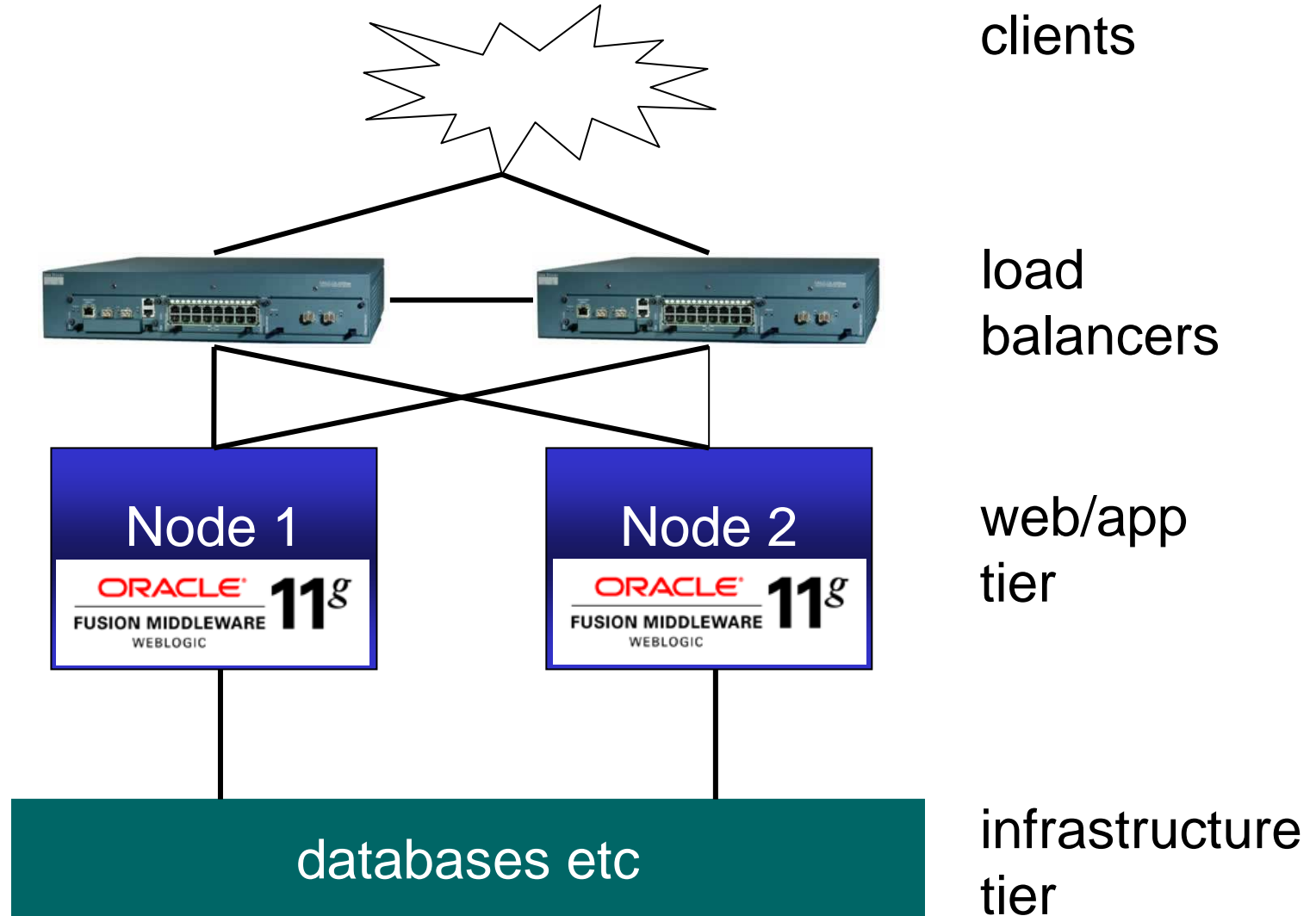


- Scalability



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# Active - Active

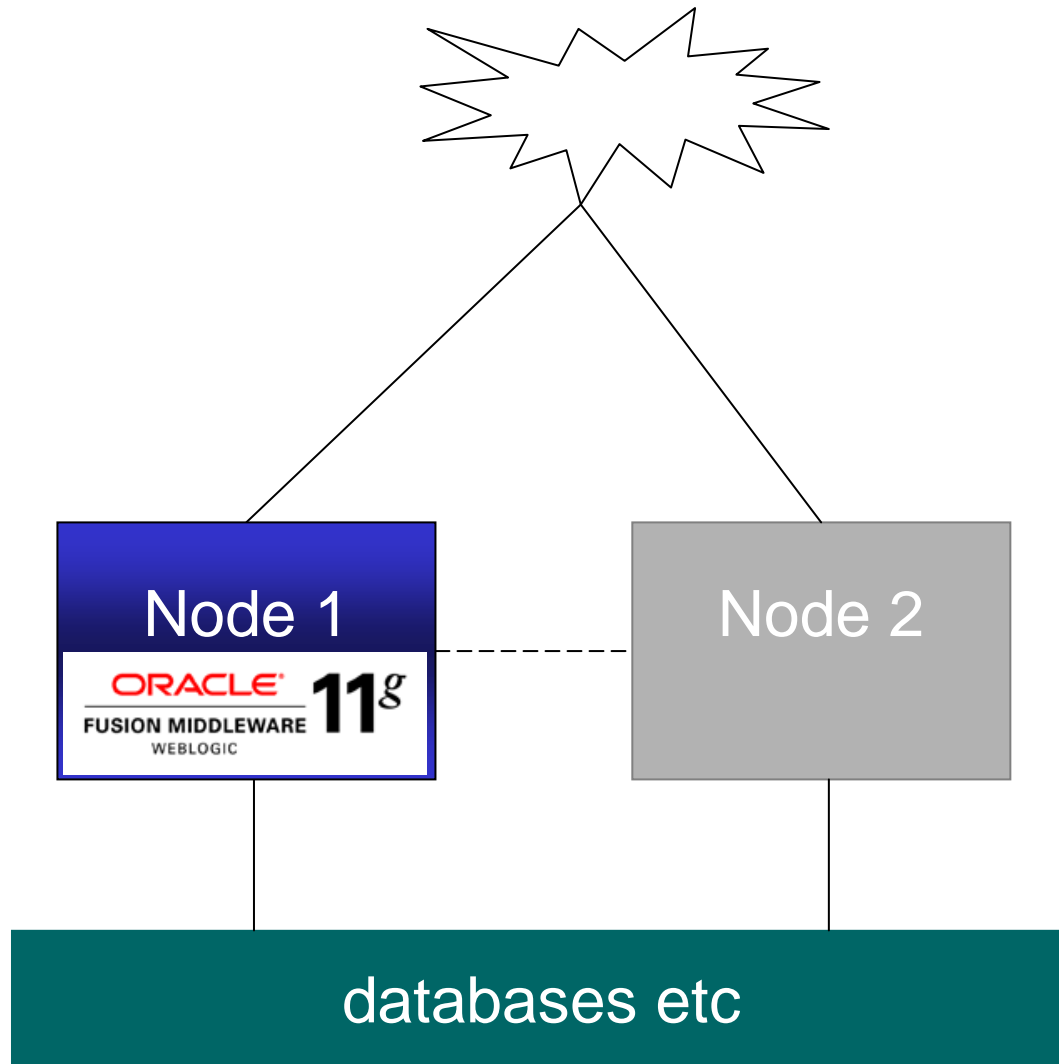


Note: no firewalls etc shown!



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# Active – Passive



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# Active-Passive Pros/Cons

- ✓ Licensing
  - OFM is only running on one node at once
  - no licence req. on standby if <10 days' usage pa
- ✓ Hardware/skills: no load balancer required
- ✓ Provides protection from node failure
- ✓ Can standardise across all sorts of systems
- ✗ 'Unused' standby server (test etc though)
- ✗ Failover time & loss of sessions
- ✗ Needs shared storage

## 1

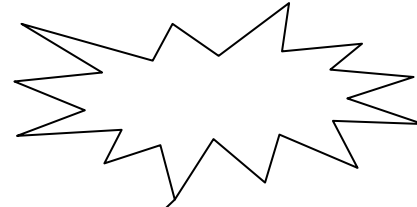
# Oracle's Software Investment Guide

Failover – In this type of recovery, nodes are arranged in a cluster and share one disk array... **When the primary node fails, one of the surviving nodes in the cluster acts as the primary node.** Solutions like Oracle Failsafe (...), or third party vendor solutions (e.g. Veritas, HP Service Guard, HACMP, Linux HA - Heartbeat) are used to manage Failover environments. In this type of environment, **Oracle permits licensed Oracle customers to run some Technology Programs on an unlicensed spare computer for up to a total of ten separate days in any given calendar year.** Once the primary node is repaired, you must switch back to the primary node. Once the failover period has exceeded ten days, the failover node must be licensed... **Downtime for maintenance purposes counts towards the ten separate days limitation.**

November 2009, <http://www.oracle.com/us/corporate/pricing/sig-070616.pdf>

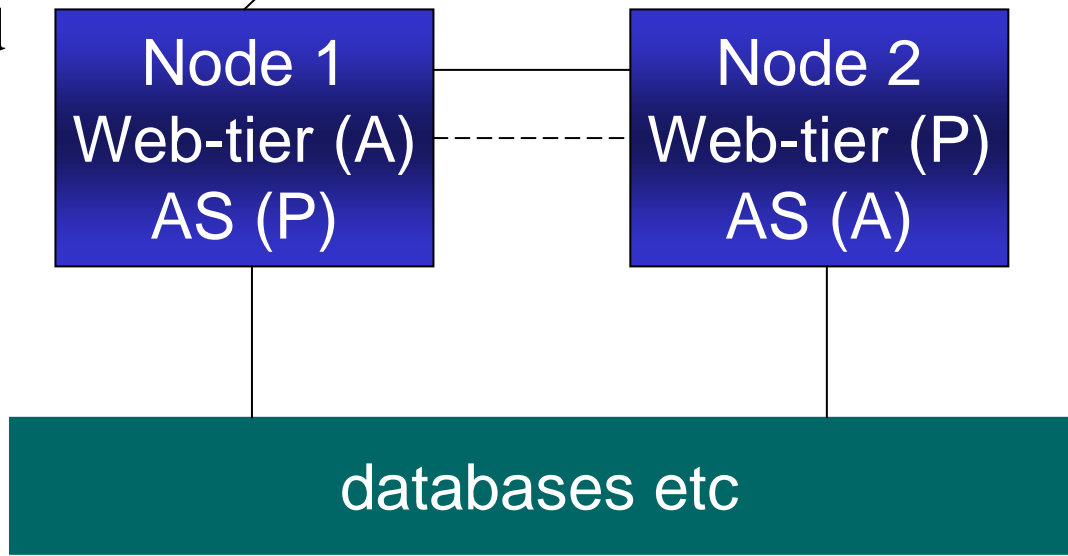
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# A/P plus P/A



Better use of hardware,  
but maybe not licences.  
Various permutations  
but often end up going A/A

Both nodes need  
to be licenced



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# Why use Cluster Software?

- A cluster needs:
  - communication between nodes
  - to know what nodes are available
  - coordinated start-up and shutdown
- There are several popular commercial and open-source cluster managers.  
You could write your own...  
...or just manually do it!

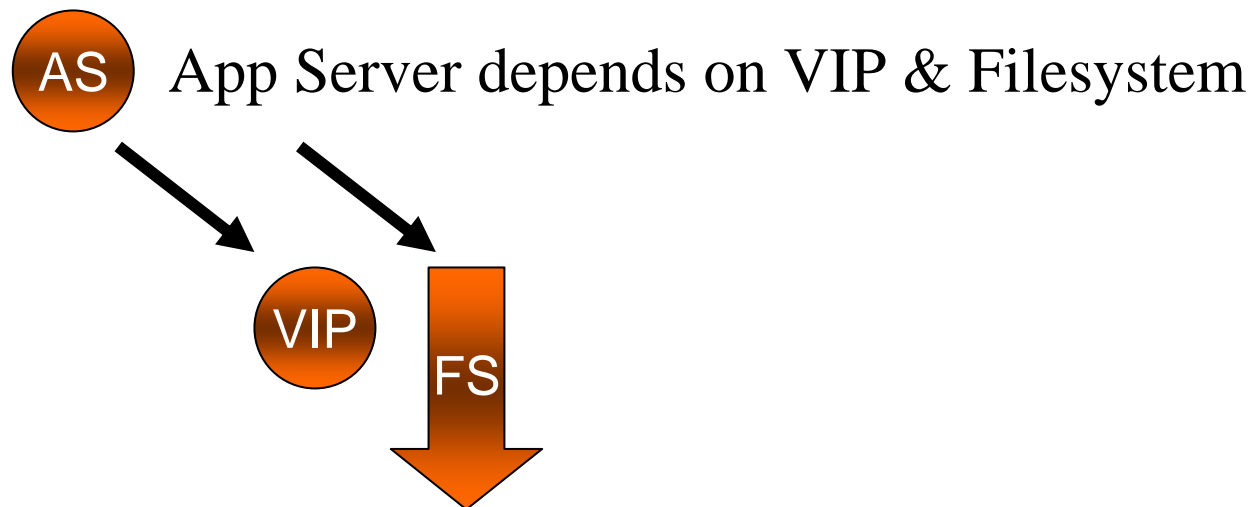


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# Cluster Software Requirements

- VIP Management
- Filesystem Management
- Application Startup/Shutdown



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# What is a VIP?

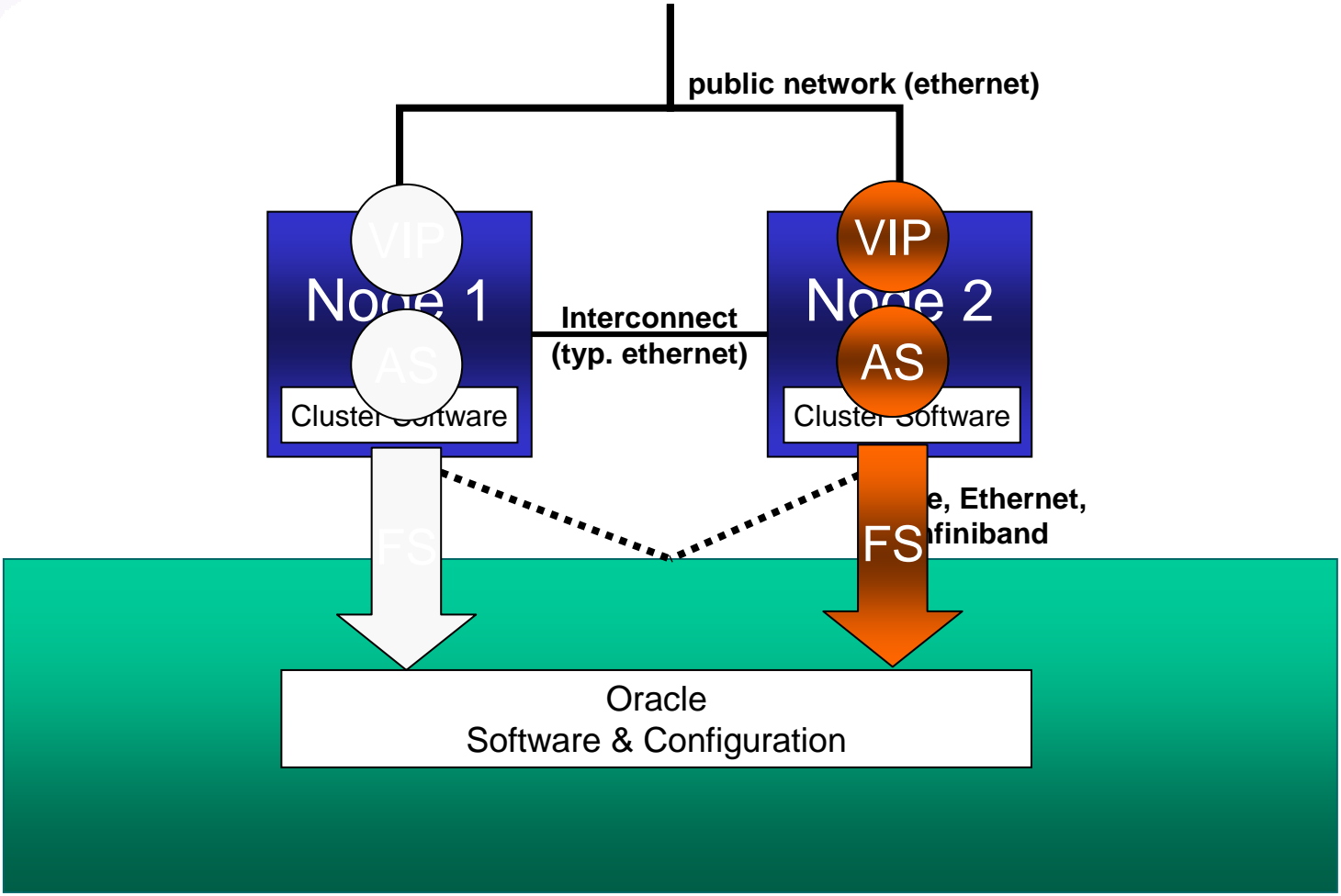
- a 'floating' IP address which can exist on any node in cluster
- only active on one node at once
- is only moved in case of failure/shutdown of the node it's currently running on
- each Virtual IP (VIP) has a corresponding Virtual Hostname (Vhost), e.g.
  - Node 1: `pw1s1.lon.example.com`
  - Node 2: `pw1s2.lon.example.com`
  - Virtual host: `store.example.com`

'public' view



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# Architecture & Processing



Shared storage (e.g. SAN or NAS)

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## By the way...

- There are other ways to do active/passive failover:
  - (WLS itself) Whole Server Migration
  - Virtual Machines

# Overall Process

- Install cluster management software
- Configure cluster resources for:
  - virtual hostname and virtual IP address
  - filesystem for Oracle Home
- Install Oracle Fusion Middleware
  - 10g iAS: specify the Vhost/VIP
  - 11g OFM: reconfiguration
- Set up cluster resource for running OFM

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## 3<sup>rd</sup> Party Clusterware

- Install & set-up (typically done by sys. admin)

2

## History: 10g App Server

- iAS 10.1.2
  - Set in installer HA screenor
  - ORACLE\_HOMENAME env variable
  - OUI\_HOSTNAME command line option
- OAS 10.13
  - VIRTUAL\_HOST\_NAME env variable
  - OUI\_HOSTNAME command line option

# 11gR1

- OFM 11gR1 High Availability Guide says to create a CFC:
  - *“Transform the Administration Server or Enterprise Manager instance*
  - *Transform all managed servers in the deployment*
  - *Transform the Oracle instances (non-Java EE deployments)”*

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## Why do I have to 'Transform' the Admin Server

- Singleton service – runs in only one place at once
- Rest of env is usually A-A and often have dedicated management server including AS

## 2 2.2.2.3 Transforming the Administration Server for Cold Failover Cluster

- Create a Machine in the first domain called <Vhost>
- Associate admin (and any managed servers) with the new Machine
- Change the Listen Address of the Admin Server to <Vhost> & restart it

## 2 2.2.2.3 Transforming the Administration Server for Cold Failover Cluster (contd.)

- Change any existing Oracle Instances to point to admin server on <Vhost> - change the OPMN instance.properties for each
- Change any EM agents to refer to EM FMC running on <Vhost> (two params) & restart

## 2 | 2.2.2.4 Transforming Oracle WebLogic Managed Servers

- If managed servers on CFC host then on each change Listen Address to <Vhost> & restart

## 2 12.2.2.5 Transforming Node Manager

- “Decide whether you want to fail over the node manager, or have one running all the time on each node”
  - If using ASCRS then NM config must be under WL\_HOME ⇒ will move ⇒ NM must failover
- Change the node manager properties file to set ListenAddress to <Vhost>. Restart NM

## 2 12.2.2.6 Transforming Oracle Process Management and Notification Server

- If OPMN already registered with Admin Server (likely if you wanted to test your installation) then update to <Vhost>
  - topology.xml
  - opmn.xml
  - instance.properties

## 2 | 2.2.2.7 Transforming Oracle Enterprise Manager for an Oracle Instance

- You probably have Oracle instances, e.g. Web-Tier, OID etc, update:
  - emd.properties
  - targets.xml
- Restart agent
- Change the targets.xml in the domain/sysman/state directory of the Admin Server

2

## 12.2.2.8 Transforming Web Tier Components and Clients

- Change Listen to <Vhost> in httpd.conf & restart

2

## 12.2.3 Transforming Oracle Fusion Middleware Components

- ...

## Pros & Cons

- ✗ Tedious work for something that, at least at installation time, should be easy
- ✓ At least it's in main documentation
- ✓ You can convert to CFC at a future point

⇒ transform WebLogic to CFC as soon as possible

- make AdminServer listen on VIP from start (e.g. during domain creation), i.e. before installing EM, Web-tier, etc
- transform other installs as you go along

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- Now you can choose your clusterware...

# ASCRS

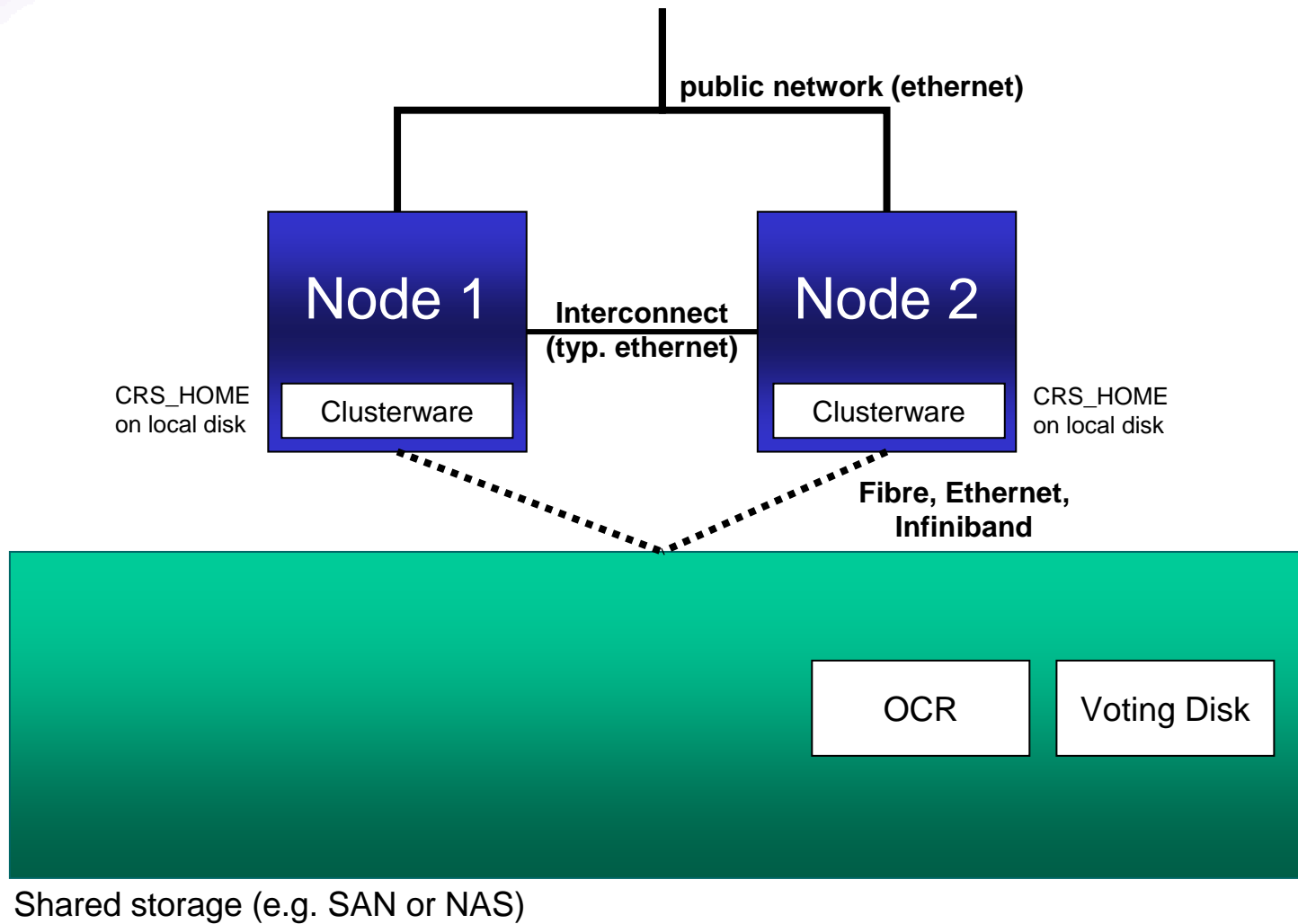
- Wrapper around Oracle Clusterware (aka CRS)
- Perl/java calling WLST etc
- New in 11gR1
- Manages resources:
  - VIP
  - Shared Disk
  - Application Server/Middleware
  - (Database & Listener...)
  
- Most suitable if you don't have 3<sup>rd</sup> party clusterware but have RAC experience

# 3 Oracle Clusterware Key Components

- Network
  - Public network
  - Interconnect (private)
- Shared storage
  - Oracle Cluster Registry (OCR)
  - Voting Disk

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# Base Oracle Clusterware

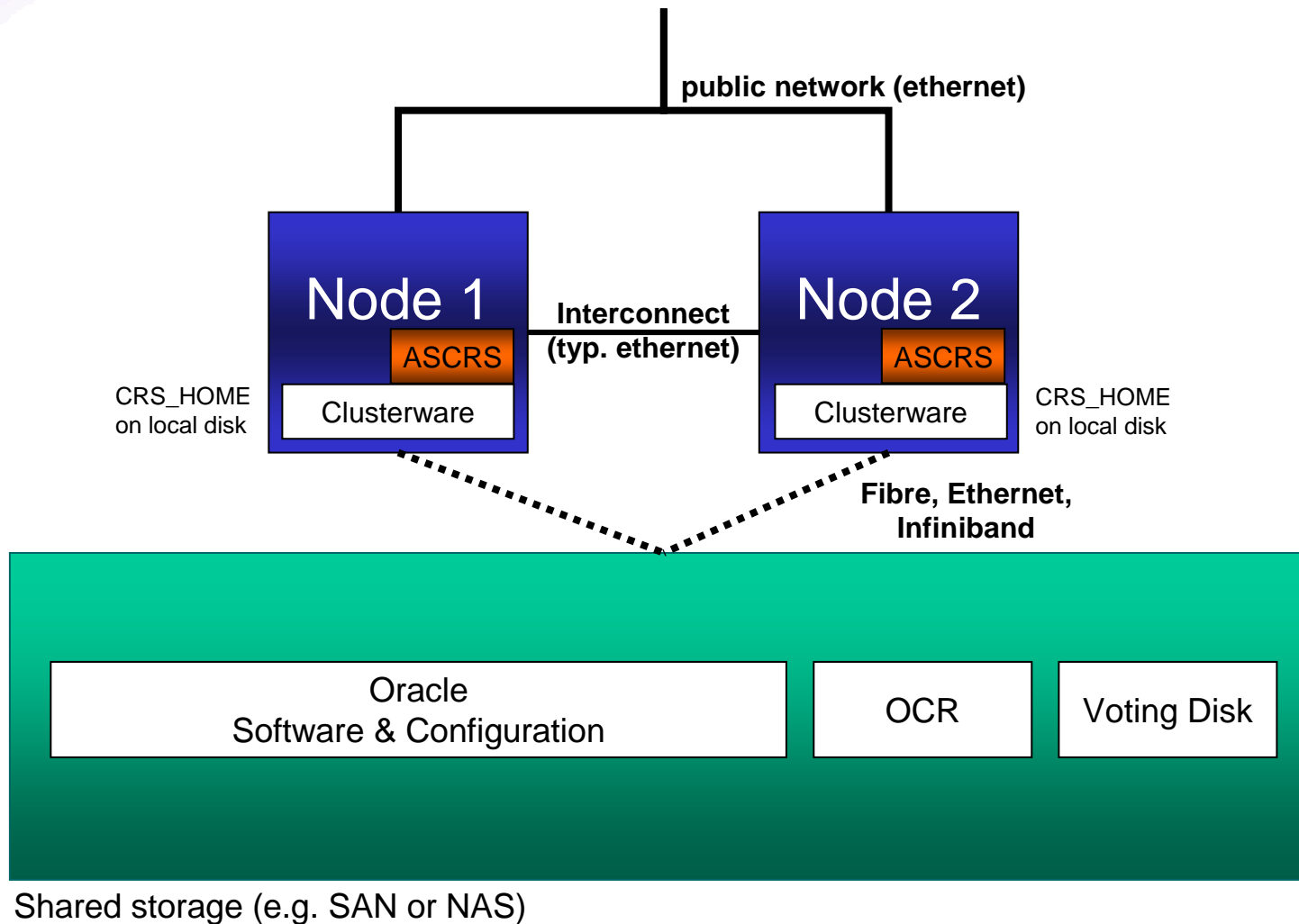


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- Install Oracle Clusterware 11gR1
- Copy <ascrs> directory from OFM 11g Companion DVD into the CRS\_HOME

3

# Oracle Clusterware plus ASCRS



3

## Example – Create VIP

```
ascrsctl create -name cluster4 -type vip \  
-ipAddr cluster4-vip -netmask 255.255.255.0 -interface eth0
```

Prompted as root to run:

```
/opt/grid/crs1110/crs/public/ora.cluster4.cfcvip.cre.root
```

3

## Example – Create Shared Disk

```
touch /opt/oracle/.ascrssf  
umount /opt/oracle
```

```
ascsctl create -n cluster4 -type disk -path /opt/oracle \  
-mc "<your script*> start /opt/oracle /dev/sdc1" \  
-umc "<your script*> /opt/oracle /dev/sdc1"
```

Prompted to run as root:

```
/opt/grid/crs1110/crs/public/ora.cluster4.cfcdisk.cre.root
```

\* Don't just use mount / umount – write a script to check usage, fsck etc and install under CRS\_HOME! e.g.  
`/opt/grid/crs1110/crs/public/veriton_cfc_orahome.sh`

3

## Example – Create AS Resource

```
ascrsctl create -n adminserver -type as \  
-ch /opt/oracle/user_projects/domains/cfc \  
-disk cluster4 -vip cluster4
```

3

# Status & Management

```
$ ascrsctl status |egrep "cfc|Name|---"
```

Name	Type	Target	State
ora.adminserver.cfcas	WebLogic Domain	ONLINE	ONLINE on westfield37
ora.cluster4.cfdisk	Shared Disk	ONLINE	ONLINE on westfield37
ora.cluster4.cfcvip	Virtual IP	ONLINE	ONLINE on westfield37

```
ascrsctl start -n ora.adminserver.cfcas
```

```
ascrsctl stop -n ora.adminserver.cfcas
```

```
ascrsctl switch -n ora.adminserver.cfcas
```

# ASCRS notes

- Unix only
- Docn now says ASCRS supports Oracle Clusterware 10.2.0.4 or 11.1.0.7+
  - Big clusterware packaging changes in Database 11gR2... next?
- ASCRS is supported only on Unix platforms
- The ASCRS installation user account should be the same as the owner of the CRS home
- Decide on naming strategy along with database products
  - with db 11.2 "grid" is becoming common practice

# Summary

- Cold-failover cluster provides fair resilience for unattended recovery from failures
- Additional costs = minimal:
  - no extra Oracle licences/support
  - extra server (maybe with HBA or iSCSI)
  - time/effort to install
- You will need shared storage (e.g. SAN/NAS)
- ➔ cost-sensitive projects where availability is important but load doesn't justify multiple active servers
- ➔ Standardised HA across broad IT environments

# References

- **Oracle® Fusion Middleware High Availability Guide  
11g Release 1 (11.1.1)**

[http://download.oracle.com/docs/cd/E12839\\_01/core.1111/e10106/ap\\_crs.htm#CHDHGHBD](http://download.oracle.com/docs/cd/E12839_01/core.1111/e10106/ap_crs.htm#CHDHGHBD)

# Shameless Plug!



- UKOUG App Server & Middleware SIG  
Wed 2nd March 2011
  - Theme: Fusion Middleware 11g Upgrade
  - Dual venue... speakers at both plus broadcast
    - Oracle City Office, London
    - Fujitsu Office, Warrington
  - 1 FREE place for most UKOUG membership packages

Any questions ?

Thank you for listening !

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