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# Comparing Oracle Real Application Clusters to Failover Clusters

Active-Active Oracle RAC vs Active-Passive failover clusters

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## INTRODUCTION

Customers looking to remove the server as a single point of failure for their database applications often implement a clustering solution. The clustering architecture is used by Oracle Real Application Clusters (RAC) and Failover Clusters, and this document assumes that the reader is familiar with clustering technologies. Oracle RAC is a unique solution that provides flexible scalability and active-active high availability for database applications. This solution is superior to active-passive failover clustering. Failover Clusters is a solution that offers higher availability than a single server. Still, the availability of the service is less than what you can achieve with Oracle RAC. You do not have the flexible scalability or utilization of hardware resources that you can have with Oracle RAC. A Failover Cluster is an active-passive solution that provides high availability for database applications by monitoring for failures and restarting the database.

## FAILOVER CLUSTERING FOR HIGH AVAILABILITY

Failover Clustering is a solution provided by cluster software vendors. The typical implementation of a failover cluster is a two-node cluster where each node runs one or more Oracle Databases. The database runs on only one node at any time. In order to avoid having the second node completely idle and waiting for a failure, customers often run other applications or databases on this node. The Oracle Database is under the control of the cluster software such that it is automatically started, stopped and monitored by the cluster software. If the database instance fails, the cluster software recognizes the failure and restarts the instance, often without operator knowledge. If the node fails, the storage, database instance and any other dependent processes are failed over to the other node in the cluster and restarted. The application experiences downtime for the period of time it takes the cluster to recognize the failure, reconfigure the cluster, and complete the failover. Depending on the size and complexity of the environment, this can take anywhere from 1-2 minutes to 20 or 30 minutes or more. If the secondary node (the node which you failed over to) is already running some workload, this node may become overloaded, and the service even degraded for the period of the outage. To provide complete coverage for server outages, you must buy twice the resource requirements of your applications.

## ORACLE REAL APPLICATION CLUSTERS (RAC)

Oracle RAC is an active-active, high availability, and scalability option for the Oracle Database. Oracle RAC is tightly integrated with Oracle Clusterware, allowing applications to benefit from these features without making any changes to the application. Oracle Clusterware binds independent servers to cooperate as a single system, providing improved fault resistance and modular incremental system growth over single symmetric multi-processor systems. In the event of a system failure, clustering ensures high availability. Redundant hardware components, such as additional nodes, interconnects, and disks, allow the cluster to provide high availability. Such redundant hardware architectures avoid single points of failure and provide exceptional fault resistance.

## Best Mission Critical Availability

During planned maintenance events, Oracle RAC instances running on independent servers benefit from rolling patching as each Oracle RAC instance can be patched one at a time, preventing costly downtime. The patching orchestration can further use features such as draining to ensure a planned and phased relocation of database clients. The impact on applications during unplanned outages is limited to the database sessions connected to the impacted server. These sessions are automatically reconnected to surviving instances without manual intervention, preventing application outages using the advanced features of Oracle RAC (Fast Application Notification) and the Oracle clients (Fast Connection Failover). Other instances of the cluster recognize the instance failure, and recovery occurs automatically. The Oracle Clusterware monitors the instance and automatically restarts itself when a failure occurs.

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## Zero Complexity Scale-out

Oracle RAC 10g and higher versions support up to 100 nodes in the cluster and up to 100 instances in the RAC database. Oracle Clusterware is included with Oracle Database versions 10g and higher. It is tightly integrated with Oracle RAC to provide a complete solution for your database applications. Oracle Clusterware monitors and manages all Oracle resources (Virtual IP, Listener, Database, Services). An API is included for customers to add non-Oracle processes to be managed by the Oracle Clusterware to keep them highly available.

Along with the higher availability, Oracle RAC provides you with flexible scalability. Instead of having to size a single server to support your application load, RAC allows you to spread the load across multiple servers that have been clustered together. Additional nodes and instances can be easily added to the cluster on demand without downtime. A RAC database can scale to 100 instances. Applications do not have to be changed to use RAC.

Oracle RAC scalability allows you to take advantage of the cost savings of using smarter servers clustered together to provide the resource requirements of your applications. A larger cluster of smarter servers reduces the impact of a server failure. If two nodes are in a cluster and one fails, you have lost 50% of your resources, and 50% of your users are impacted. If you lose one node in a cluster of 10 nodes, you have only lost 10% of your processing power, and only 10% of your users are affected. So, to provide the same amount of resources to your applications during failure, you only need 10% additional resources.

### CONCLUSION

Oracle Real Application Clusters have been designed for high availability and scalability. Oracle Real Application Clusters provide system availability by protecting the system from hardware and software failures and ensuring continuous data access. Its scale-out and scale-up features offer a platform that can grow in any direction, allowing enterprises to grow their businesses. Existing applications, as well as newly developed applications, benefit from the transparency Oracle Real Application Cluster provides. Application development, as well as administration and change management, thus become much easier, allowing a reduction in the total cost of ownership. Oracle Real Application Clusters is unique to the market with its offerings and capabilities. RAC is used by thousands of customers worldwide in all industries in mission-critical and many other application environments.

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