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Integrating Oracle8 with Windows NT

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Agenda



- Windows NT Basic features
- Oracle8 Architecture on Windows NT
- Integration of Oracle8 with Windows NT Tools
- Integrating Oracle8 administration with Windows NT
- Using Windows NT properly to improve the performance of Oracle8



Oracle8 Architecture on Windows NT

Windows NT Basic features



- GUI tools
- Mandatory logon
- Supports FAT, HPFS, NTFS and CDFS
- Variety of Disk Configurations for fault tolerance
- Multi-Threaded Operating System
- Preemptive Multi-Tasking Operating System
- Uses 'TRUST' to simplify administration of resources and users

Oracle8 on Windows NT



- Multi-Threaded model
- 2GB address space per user process
- 2GB shared address space
- 1MB reserved space per thread

Oracle8 solutions for increasing the concurrent connections on Windows NT



- Multi-Threaded Server
- Connection manager
- Connection pooling
- Orastack

Multi-Threaded Server



- Allows many user threads to share very few server threads.
- User threads connect to a dispatcher process which routes client requests to the next available server thread

Result: More users are supported.

Connection Manager



- Concentrates multiple clients into a single multiplexed data connection.
- Clients can use different protocols

Result: Applications can be used continuously by the clients.

Connection Pooling



- Places idle users in a suspended mode and reassigns their physical connections until they become active again.

Result: Ideal for users that need to be logged on all the time but don't need to really use the application.

Orastack



- Can be used to change the default reserved stack space used by each Oracle thread.
- **USE WITH EXTREME CAUTION**

Result: Allows more user connections.



Oracle8 integration with Windows NT tools

Integration with Windows NT tools



Easy Installation which consists of running setup.exe for the appropriate hardware from the cd-rom.

- Starter database can be created
- GUI Instance manager and SQL*NET easy configuration simplifies new instance and database creation
- initSID.ora, build_db.sql and buildall.sql can be modified for quick database creation

Integration with Windows NT tools



Windows NT registry stores Oracle specific information in the HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE hive. These entries include :

- DBA_AUTHORIZATION
- NLS_LANG
- ORACLE_HOME
- ORACLE_SID

- ORA_sid_WORKINGSETMIN
- ORA_sid_WORKINGSETMAX
- Variable declaration for use with SQL*PLUS
- Product specific variables

Integration with Windows NT tools



Oracle instance runs as a service on Windows NT and therefore it can be used to automatically start the database without the user logging on the system.

-OracleServiceSID

-OracleStartSID

Integration with Windows NT tools



- Windows NT scheduler can be used to schedule jobs and Windows NT scripts for backups etc.
- Windows NT scripting language is very powerful and can be used with the Windows NT resource kit to provide a very flexible and powerful environment.

Integration with Windows NT tools

----Disk Administrator



Common RAID levels used in Oracle8 installations:

- RAID level 0:
 - Enables high-performance, non-fault tolerance disk striping
 - It places multiple physical disks into one logical whole and data operations are broken into [#ofdrives] chunks and all the disks are simultaneously accessed.
- RAID level 1:
 - Disk Mirroring
 - Every write is duplicated on another drive

Integration with Windows NT tools

-----Disk Administrator



- RAID level 0+1:
 - Mixture of RAID 0 and RAID 1
 - It enables mirroring of an array of striped hard disks
- RAID level 5:
 - Provides a cost-effective alternative to Disk Mirroring
 - Multiple hard drives are combined into a striped logical volume and each drive contains parity information.

Integration with Windows NT tools



- Integration with the Event Viewer
- Integration with the Performance Monitor
- Integration with User Manager
- Windows NT Diagnostics

Integration with Windows NT tools



- Oracle8 Wizards can be used to simplify the management of Oracle databases on Windows NT.
 - Oracle Database Assistant
 - Oracle Data Migration Assistant
 - Oracle Web Publishing Assistant
 - Oracle Migration Assistant for MS Access
 - Oracle Net8 Assistant

Integration with Windows NT tools



- Open Data Access allows the integration of Oracle8 on Windows NT with any environment.
 - ODBC
 - Oracle Objects for OLE
 - JDBC
 - Native Oracle drivers

Integration with Windows NT tools

---Data Cartridge Architecture



- The Data Cartridge Architecture is open and allows the capabilities to be easily extended by means of customized cartridges. Several cartridges are provided with Oracle8:
 - Context Cartridge
 - Spatial Data Cartridge
 - Image Cartridge
 - Video Cartridge

Integration with Windows NT tools

---Windows NT Resource Kit



- Windows NT Resource Kit provides a variety of useful tools that can be used to simplify the administration of Oracle8 on Windows NT. Some of the tools commonly used include:
 - DUMPEL.exe
 - KILL.exe
 - TLIST.exe
 - PERFMTR.exe
 - PSTAT.exe
 - PFMON.exe
 - SC.exe

Recovery Manager



- Allows creating, managing and restoring the database backups while maintaining superior performance and high availability of the database.
- Allows backing up the entire database or a subset of the database.
- Avoids operator errors and provides for the checking of database corruption.
- Automatic parallelization of backups and recovery

Recovery Manager



- Minimize redo generation
- Allows hot and cold backups
- Supports tape backups in conjunction with vendor-supplied tape management software like Legato or Epoch.
- Recovery catalog stores information about the backups and the archived logs.

Recovery Manager



- Possible to use without RMAN in which case the information is obtained from the control file. In this mode, point-in-time recovery is not possible and neither is automatic recovery when the control file is not current.

Using OS Authentication with Oracle8 and different Windows NT models



- **In a single domain model and proper NT/Oracle setup, any domain user can be authenticated by the operating system if domain logon is successful.**
- **In a two domain master-resource domain model with proper NT/Oracle setup, any domain user can be authenticated by the operating system provided the user logs on successfully into one of the NT domains.**

Using OS Authentication with Oracle8 and different Windows NT models



- In a two domain master-master domain model with proper NT/Oracle setup, any domain user can be authenticated by the operating system provided the user logs on successfully into one of the NT domains.
- OS authentication does not depend on who is logged onto the NT server upon which the database resides because the Oracle services and NT security accounts database operate independently of the user currently logged on.

Using OS Authentication with Oracle8 and different Windows NT models



- In a workgroup model when the user logs on locally to their NT machine and not to a domain, a user can be authenticated by the operating system if the same username/password combination is defined locally on both the client and server machines or a client user maps a drive to the Oracle server machine using username/password of a local server account that is valid to both NT and Oracle.



Configuring and Tuning

Characteristics of Optimally tuned Oracle8 on Windows NT



- **Little or no Waiting on I/O**
- **Most of the CPU utilization is allocated to the shadow threads and not the background threads**
- **Most of the CPU utilization is in the user mode and not the privileged mode.**
- **Good response time**
- **System should be CPU bound**

Characteristics of Optimally tuned Oracle8 on Windows NT



***Little or no Waiting on I/O**

which indicates that the CPU has work to do while there are outstanding I/Os

- processor utilization (Processor:%Processor time)**
- Disk utilization (LogicalDisk/PhysicalDisk: Disk Transfers/sec)**
- Length of processor queue (System: Processor Queue Length) and**
- Threads performing I/O (Thread: %Processor time**

Characteristics of Optimally tuned Oracle8 on Windows NT



***Most of the CPU utilization is allocated to the shadow threads and not the background threads**

- CPU utilization at the thread level (Thread: %Processor time)

***Most of the CPU utilization is in the user mode and not the privileged mode.**

-CPU time spent in the user versus privileged mode for the oracle process (Process: %User time/%Privileged time)

***Good response time**

-This is highly dependent on the application and network tuning .

Characteristics of Optimally tuned Oracle8 on Windows NT



***System should be CPU bound. If the system is CPU-bound then high scalability can be achieved by adding processors. Verify the following to ensure that the system is not I/O bound.**

-Oracle8 uses the Asynchronous capabilities of Windows NT and therefore only one DBWR is needed.

-Isolate Sequential I/Os to their own controller volume. The redo logs are accessed in a sequential write-only manner therefore they must be placed on their own disk.

Characteristics of Optimally tuned Oracle8 on Windows NT



- Random I/Os should be balanced across drives. Datafiles are accessed in an random fashion and should be striped if possible.**
- Disks containing redo logs should be mirrored.**
- I/O rate capabilities should not be exceeded. Based on Compaq testing, random I/O should not exceed 60 I/Os /sec for 4GB drive, 50 I/Os/sec for 2GB drives or 40 I/Os/sec for 1GB and 500MB drives.**

Characteristics of Optimally tuned Oracle8 on Windows NT



-Use the performance monitor to determine the number of I/Os/sec for each logical volume. Based on the fault tolerance level of the volumes determine the I/Os per disk.

No-fault tolerance used : (Disk reads + Disk writes)/#ofdrives

Mirroring(Disk reads + 2*Disk writes)/#ofdrives

Data guarding: (Disk reads + 4*Disk writes)/#ofdrives.

***Tuning the hardware is crucial and this can be done by looking at the system documentation of the platform in use.**

Tuning Windows NT to improve the performance of Oracle



- **Choose “Maximum throughput for network applications” in the control panel.**
- **Disable services not needed.**
- **Oracle_priority**
- **Apply the latest service packs**

Guidelines for changing the thread priorities



- **Threads waiting for input receive a priority boost**
- **Threads that complete a voluntary wait receive a priority boost**
- **Threads receive a priority boost periodically**
- **Compute-bound threads get their priority reduced.**

Contection



- **There are four major system resources that can contribute to contention and performance problems:**
 - **System Memory**
 - **CPU**
 - **Disk I/O**
 - **Network**



File system considerations

File system recommendations to improve performance



- **Use FAT for the initial boot partition**
- **Place Oracle executables on FAT**
- **Place system, log and data files on NTFS**
- **Use raw partitions for I/O bound systems**

FAT v/s NTFS



- **Security:** FAT filesystem does not provide file-level security while NTFS filesystem provides file-level security.
- **Max File Size:** FAT allows a maximum file size of 4GB (16 GB for NT 4.0) while NTFS allows a maximum file size of 16 Exabytes
- **Performance:** Use FAT for smaller disk volumes while for disk volumes greater than 200MB NTFS is better.



Summary



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Questions?

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