

Problem Management

- **DBA needs to log all problems**
 - Procedures need to be put into place to record who, what, where, when, how, and how long
 - Enables you to go back and recreate both the problem scenario and corrective actions taken
 - Helps you easily address problems that have been encountered in the past
 - Invaluable when talking to Ingres Technical Support
- **DBA is typically the first point of contact for ALL issues**
- **The goal is to avoid outages through proactive monitoring and procedures, and to minimize those outages when they occur!**



Performance

- **Typically there are two main types of system activity:**
 - On-line Transaction Processing (OLTP)
 - Reporting activity
- **Two components of Ingres performance.**
 - Performance within Ingres (Includes server tuning, storage structures, database design, locking, etc.)
 - Performance of the platform Ingres is running on (OS performance, disk performance, etc.)
- **DBA needs to work with the System Administrator (SA) on OS related matters**
- **DBA needs to monitor Ingres performance (using tools like IPM and Visual DBA)**



Making Changes

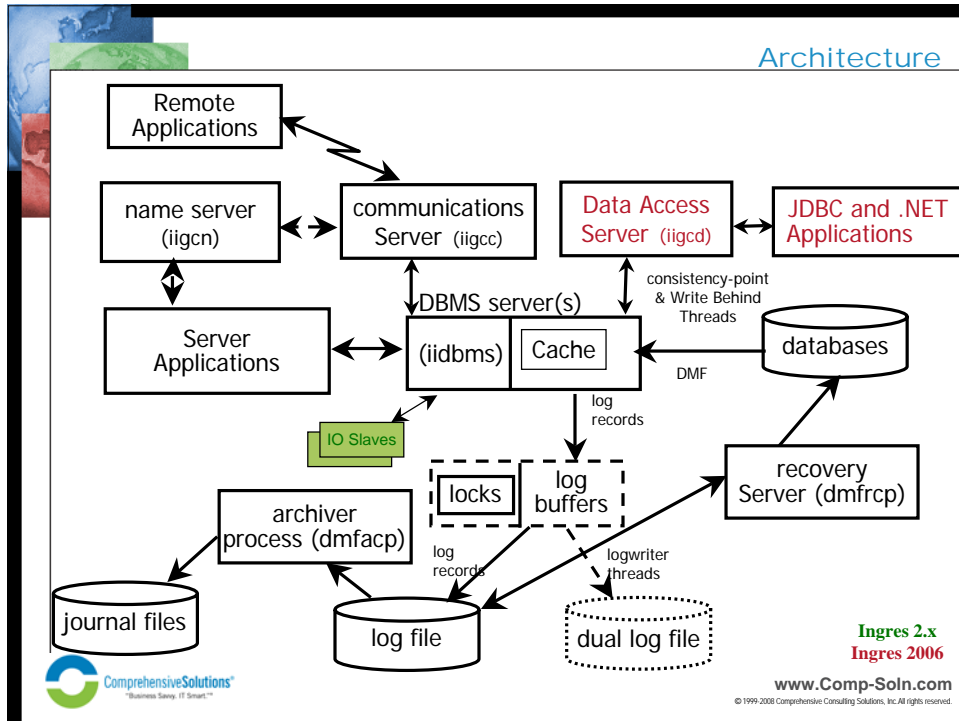
- **Document all changes**
 - This makes it easy to recreate
 - Additional / new environments
 - Disaster Recovery
 - Easy to back out
- **Change one thing at a time whenever possible!**
 - Consider using a “Design of Experiments” (Six Sigma) approach if this is not possible
- **Benchmark before and after**
 - If the result is positive, document and move on
 - If the result is negative, back it out



Table Optimization

- The Ingres optimizer is “cost-based” and relies on statistics to generate what it believes to be a good query plan (QEP)
 - The “optimizedb” command is used to generate statistics
 - Statistics gathered include min/max values, count, and histograms
 - Takes a brief table lock when running (don’t run during the middle of a production day)
 - The “statdump” command will copy statistics to a file (for recovery purposes or to replicate to another DB)
 - Statistics should periodically be regenerated as the data distribution changes
 - Can generate statistics from within the Visual DBA environment





- ## Checking the Logs
- You should scan the log files several times a day to determine what is “normal” for your installation
 - This process can be automated via scripts
 - (CCSI Tools – scan_errlog.ksh)
 - Common errors encountered:
 - Timeout errors (Not a problem if they only happen sporadically)
 - Deadlocks
 - Generally indicative of poor query, transaction, or index design
 - OK if only occurring occasionally
 - Look for patterns and trends
 - Remote aborts
 - Usually when a client dies without releasing a session
 - Not usually a server problem -most likely a spurious error (i.e., “noise”)
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Checking the Logs

- “Database does not exist” errors
 - Usually caused by someone typing in a database name incorrectly
- “Database unavailable” errors
 - Often due to processes having an exclusive lock, such as “sysmod” or an offline checkpoint
 - Could indicate a corrupt database - run “infodb” on the database for more info
- Any disk-related errors are critical. May require recovery from a checkpoint
 - Most common is running out of disc space
- Errors indicating an “inconsistent database” are critical. Contact tech support. May require recovery from a checkpoint.
 - Do NOT use “verifydb” to mark a database consistent unless advised to by Ingres
- Ingres processes dying or shutting down on their own
 - Check disk space - may be due to a full filesystem



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Within Ingres

- IPM or Visual DBA
 - Logging system:
 - Is the log file at one of these two limits?
 - Force Abort
 - Log Full
 - Try to identifier the root cause offender that is holding a transaction open for an excessive length of time, and could be doing an excessive amount of work within a transaction
 - Locking system
 - Are sessions waiting on locks?
 - Identify sessions holding locks that are blocking other users



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- Possible causes:
 - "Ad Hoc" queries running
 - Statistics on tables are not valid
 - Poorly designed queries
 - Poorly designed database
 - Excessive system load
 - Server is I/O bound
 - Server is CPU bound
 - Network is saturated
 - Concurrency (locking) problems
 - Poor disk response (contention, poor virtual disk layout)
 - CCSI Tools: writebench - Free disk benchmarking tool

- Usually can be traced back to poor application (transaction) design
 - Check for new releases of an application or product to your environment
- Also can be caused by "Ad Hoc" queries that update the database
- These problems are typically addressed by the development group (or the vendor in the case of a software package)
- Compliance issues
 - Access to data
 - Unauthorized changes
 - No audit trail

- Ingres Management Architecture
- SQL based interface to Ingres memory structures in a useful manner
- Performance Monitoring
- Real Time Server Management
- Visual DBA
- Used by some custom and Third-Party Tools

- imadb
 - Created during installation
 - Create manually if upgrading
 - Scripts in \$II_SYSTEM/ingres/vdba
- Any \$ingres owned database
- Tables are created using REGISTER TABLE


```
register table ima_installation_info (
  vnode varchar(64) not null not default is 'VNODE',
  cpu_count integer4 not null not default is 'exp.clf.unix.cs.num_processors'
) as import from 'tables'
with dbms = IMA,
structure = sortkeyed,
key = (vnode);
\p\g
```

