



## MXDPERFSTAT

# Achieving Optimum ArcGIS Server Performance in an Oracle/SDE Environment

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# Objectives



- **What is MXDPERFSTAT?**
- **Common MXD Optimizations**
- **MXDPERFSTAT - Initial Run Results**
- **Oracle/SDE Optimizations**
- **MXDPERFSTAT - Final Run Results**
- **MXDPERFSTAT - Live Run**
- **SRP Current Hardware/System Architecture**
- **ESRI Hardware/System Architecture Recommendations**
- **Lessons Learned**
- **Questions**

## Who's in the Audience???



- **ArcGIS Server app in production?**
- **Planning to?**
- **Dissatisfied with performance of app?**
- **Using Oracle Spatial/SDE?**
- **Used/heard of MXDPERFSTAT?**

# The Discovery



- I developed ArcGIS Server app
- Cartographer developed MXD
- Customers were pleased with functionality, but complained about slow response times
- Developer gets blamed for lousy app
- Developer never admits fault and looks to lay blame on others
- No engineers involved in project, so points finger at cartographer

**Enter ESRI's Tom DeWitte and the MXDPERFSTAT utility ...**

# What is MXDPERFSTAT?



- **Command line based ArcEngine app which analyzes ArcMap MXD layers**
  - Identifies potential problem layers
  - Predicts why layer's performance is subpar
  - Statistics help you zero in on solutions to problems
  
- **Statistics:**
  - Total refresh time per scale range
  - Total refresh time per layer
  - Drawing time
  - Database retrieval time
  
- **Written by ESRI**

# Common MXD Optimizations



- **Use scale thresholds**
- **Turn very few layers on by default**
- **Keep labeling to minimum / use annotation**
- **Use simple symbology**
- **Stay away from halos**
- **Try not to symbolize, label, definition query on joined fields**
- **Index fields used in joins and query tasks**

**HOW DO WE MEASURE EFFECTS OF THESE MODIFICATIONS?!?**

# Overall Refresh Rates



Scale	Initial Baseline	Final Baseline	Initial All Layers	Final All Layers
500,000	1.09	1.13	43.98	0.95
35,000	0.61	0.55	5.44	0.25
6,000	1.06	0.72	5.50	2.11
2,700	1.16	0.77	5.41	1.91
1,200	0.84	0.70	4.56	1.84

# MXDPERFSTAT - Initial Run



Feature Class	Scale	Initial Run	Fix	Final Run
Irrigation Structure	2700	0.20		
Drain	2700	0.23		
Lateral	2700	0.98		
EPAD	2700	0.19		
Easement CL	2700	0.31		
Easement Extent	2700	0.27		
Distribution Substation	1200	0.33		
Pvt Structure	1200	0.17		

# What did we fix?



Feature Class	Scale	Initial Run	Fix	Final Run
Irrigation Structure	2700	0.27	Oracle high water mark	
Drain	2700	0.30	Oracle high water mark	
Lateral	2700	1.06	Oracle high water mark	
EPAD	6000	0.27	SDE spatial view	
Easement CL	6000	0.39	SDE spatial view	
Easement Extent	6000	0.34	SDE spatial view	
Distribution Substation	1200	0.33	Simplified symbology	
Pvt Structure	1200	0.17	Removed halo	



- **Oracle high water mark issue**
- **Use SDE spatial views instead of MXD joins**
- **Make sure DBMS statistics are being run at regular intervals**
- **Update spatial indexes at regular intervals**
- **Oracle Spatial does not deal well with features containing a large amount of vertices**

# MXDPERFSTAT – Final Run



Feature Class	Scale	Initial Run	Fix	Final Run
Irrigation Structure	2700	0.27	Oracle high water mark	0.06
Drain	2700	0.30	Oracle high water mark	0.08
Lateral	2700	1.06	Oracle high water mark	0.23
EPAD	6000	0.27	SDE spatial view	0.06
Easement CL	6000	0.39	SDE spatial view	0.08
Easement Extent	6000	0.34	SDE spatial view	0.16
Distribution Substation	1200	0.33	Simplified symbology	0.08
Pvt Structure	1200	0.17	Removed halo	0.08

# MXDPERFSTAT – Live Run



## ■ Run from command line:

```
mxdperfstat -mxd lrim.s.mxd -scale 500000;35000;6000;2700;1200 -xy 413910;943720
```

## ■ Specify:

- MXD
- Scale thresholds
- X,Y location



## ■ **Server Specs**

- Windows 2003 Server SP1
- 8GB RAM
- 2 dual-core AMD 2.61 GHz Opteron Processors

## ■ **Architecture**

- ArcGIS Desktop/Server 9.3 SP1
- SOM/SOC
- Web Server
- SDE Server
- Image Server



- **2 ArcGIS Server web servers with ...**
  - 2 dual-core Intel x5260 3.33 GHz processors
  - 8 GB RAM
  - 15k rpm SCSI internal disk drives w/average seek time of < 4ms
- **Separate Image Server from ArcGIS Server and web server**
  - Both require significant CPU and RAM
- **This configuration will support up to 100 concurrent users and greatly improve application stability**

## Lessons Learned



- **Never let a cartographer design MXD for ArcGIS Server app**
- **Scale thresholds and simple symbology are huge**
- **Take advantage of SDE Spatial Views anytime you need to combine data from two SDE objects (feature classes/tables)**
- **Use SDE Direct Connection to database**
- **Oracle Spatial doesn't deal well with features with many vertices**
- **Map caching will not help us – dynamic data**
  - DBMS Statistics
  - Update spatial indexes
- **Use MXDPERFSTAT periodically to monitor MXD/database health**
- **Hardware and system architecture matter!!!**

## In Summary



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# Questions & Contact Information



- **Get MXDPERFSTAT:**

- <http://arcscripts.esri.com/details.asp?dbid=15570>

- **Contact Information**

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