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### OVERVIEW

- Case Study: Ministry of Energy and Minerals, Dar es Salaam, Tanzania
  - The situation
  - The solution
  - The outcome
- Summary of the lessons learnt
- Questions

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### THE SITUATION

- 2006
  - Mining Cadastre Information Management System Projected commenced
  - Data migration
  - Data cleaning
  - Workflow implementation – 72 active workflows
  - User training

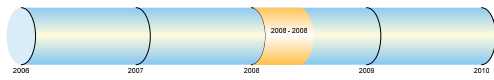
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### THE SITUATION

- 2007
  - Final data import
  - Go-Live
  - 2 Servers (2 dual core processors, 2GB RAM)
  - VSAT for VPN connection – future use
  - 10 users
- Mid 2007
  - Critical Hardware failure – RAID drives
  - Resulting in single server implementation hosting the
    - web server,
    - database server,
    - map server,
    - file server
    - spatial database server
    - image server

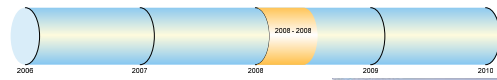
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## THE SITUATION

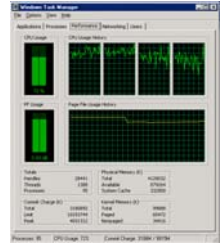


- 2008
  - User base increased to between 45-60
    - Introduction of remote offices
    - More Head Office personnel using FlexiCadastré
  - High volume of data
    - 39,453 licenses in the system
      - Almost 15,000 active licenses
      - Approximately 18,000 applications
    - 291,924 actions in the system
    - Almost 90,000 open actions
  - Resulted in
    - Hardware limitations
    - Software limitations
    - Other issues

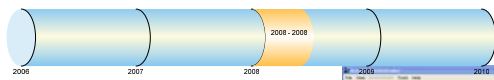
## THE SITUATION



- Hardware limitations
  - Server processor running high all the time
  - Server memory constantly at its maximum
  - Constant Disk I/O
  - Server hardware resources exhausted
  - Server required "baby-sitting"



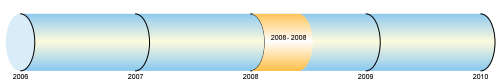
## THE SITUATION



- Software limitations
  - SQL Server
    - Slow SQL query response
    - SQL time-outs, deadlocks
  - Internet Information Services
    - 1 process, running above 1.5GB
  - ArcIMS
    - Mapping issues
  - SDE
    - connectivity sporadic
    - Map rendering failure



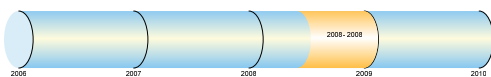
## THE SITUATION



- Other limitations
  - Poor network connectivity from the ZMO/RMO's
  - Viruses on the network

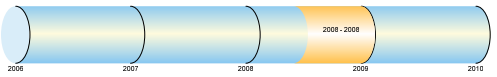


## THE SOLUTION



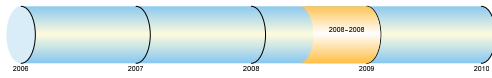
- Mid 2008
  - A team was put together to analyse and assess the situation
  - The recommendation
    - Client-side Plan of Action
    - Spatial Dimension Plan of Action

## THE SOLUTION



- Client-side Plan of Action
  - Procure latest technology servers
  - Acquire Gigabit switches
  - Audit user machines
  - Consult with ISP regarding remote offices' connectivity
  - Implement a reliable power backup system
  - Authorise upgrade to latest FlexiCadastré with ArcGIS Server technology
  - Provision for a Fail-over system

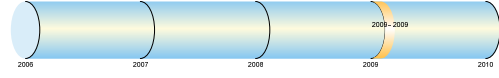
## THE SOLUTION



- Spatial Dimension Plan of Action
  - Replicate client-site issues with regard to FlexiCadastré and implement sustainable solutions
- Code solutions resulted in
  - SQL query optimisation
  - Deadlock elimination
    - Database tables re-indexed
  - Load-Balance functionality implemented
    - Next website in a sequential list
    - Spread the CPU load across processors



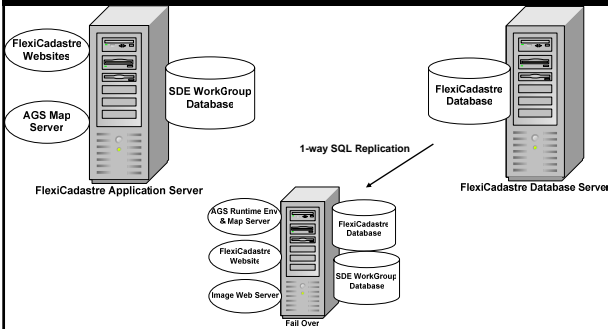
## THE SOLUTION



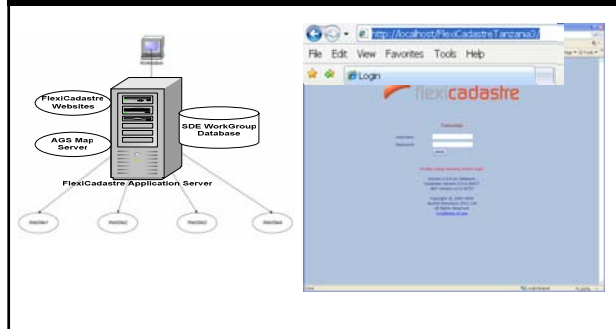
- 2009
  - Servers arrived at the Ministry of Energy and Minerals
  - 2 Resources deployed to Dar es Salaam on a "Rescue Mission"
  - Migration to New Servers – distributed solution
  - Audited user machines
  - Removed all viruses
  - Setup backup procedures
  - SQL Server Replication
  - Test Environment
  - Fail-Over Environment



## THE SOLUTION – THE ARCHITECTURE



## THE SOLUTION – LOAD BALANCING



## THE OUTCOME

- Results of the new deployment
  - Hardware
  - Software
  - Other



## THE OUTCOME

- Hardware Report Back
  - Memory load spread over multiple application processes
  - Processing spread across CPU's
  - Minimal server administration



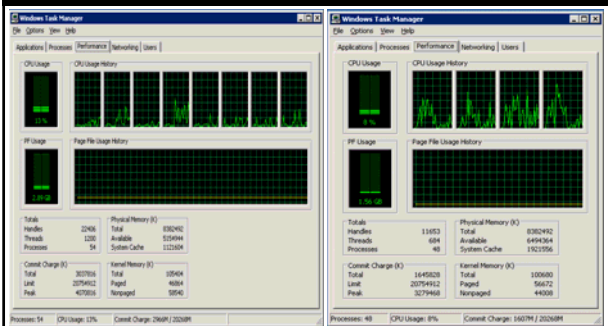
## THE OUTCOME

- Software Report Back
  - Faster searches
  - Quicker shape validation
  - Load balance functionality spreads the load
  - Elimination of SQL time-outs and deadlocks
  - Mapping interface stable and easy to manage
  - SDE connectivity constantly available
  - Virus free environment
  - An overall improvement in performance
  - An increase in productivity

## THE OUTCOME

- Other Report Back
  - Virus free environment
  - Reliable Backup Plan
  - Successful database replication

## THE OUTCOME



## USER FEEDBACK

- “Previously I processed 2 to 4 licenses a day. Today I have already printed 30 offers” – Frank Makyao, Assistant Licensing Officer
- “The shape validation used to run for 4 or 6 minutes before. It is very fast now.” - Sebastian Massau
- “I have no problems with the new FlexiCadastre. The users are happy, I am happy” - Slimmu Mtigile, Assistant Head of Licensing and Mineral Right Registry

## SUMMARY: LESSONS LEARNT

- Anti-virus programs are a must.
- Face time with the user is invaluable.
- Data backups are not to be taken lightly.
- Testing backup sets could save hundreds of man-hours' worked
- Fully functioning air-conditioners are a must.
- Regular testing of UPS is not a waste of time.
- FlexiCadastre administrators play a huge role in outlining users' feelings regarding the system.
- Users' commitment to go beyond their daily tasks assist in diagnosing intermittent issues.

## QUESTIONS

Questions