CAD-GIS Integration:

Achieving Commercial Reality with Open Source Solutions

FOSS4G – 2008 - ZA

Crispin Hoult, 1Spatial

Agenda

- Introductions
- The Data Access/Quality Symbiosis
- CAD-GIS Integration – A Spatial Context
- Open Source Options – FDO
- Solutions: MapRelate and AutoCAD
- Solutions: Radius Check and SQL Server
- Questions

Introductions

- The Contenders:
  - Representing CAD Data
    - Personal and Departmental Design Files
  - Representing Spatial Data
    - Enterprise GI Databases

  - Representing Data Quality
    The Referee, Judge and Jury - 1Spatial

The Issue

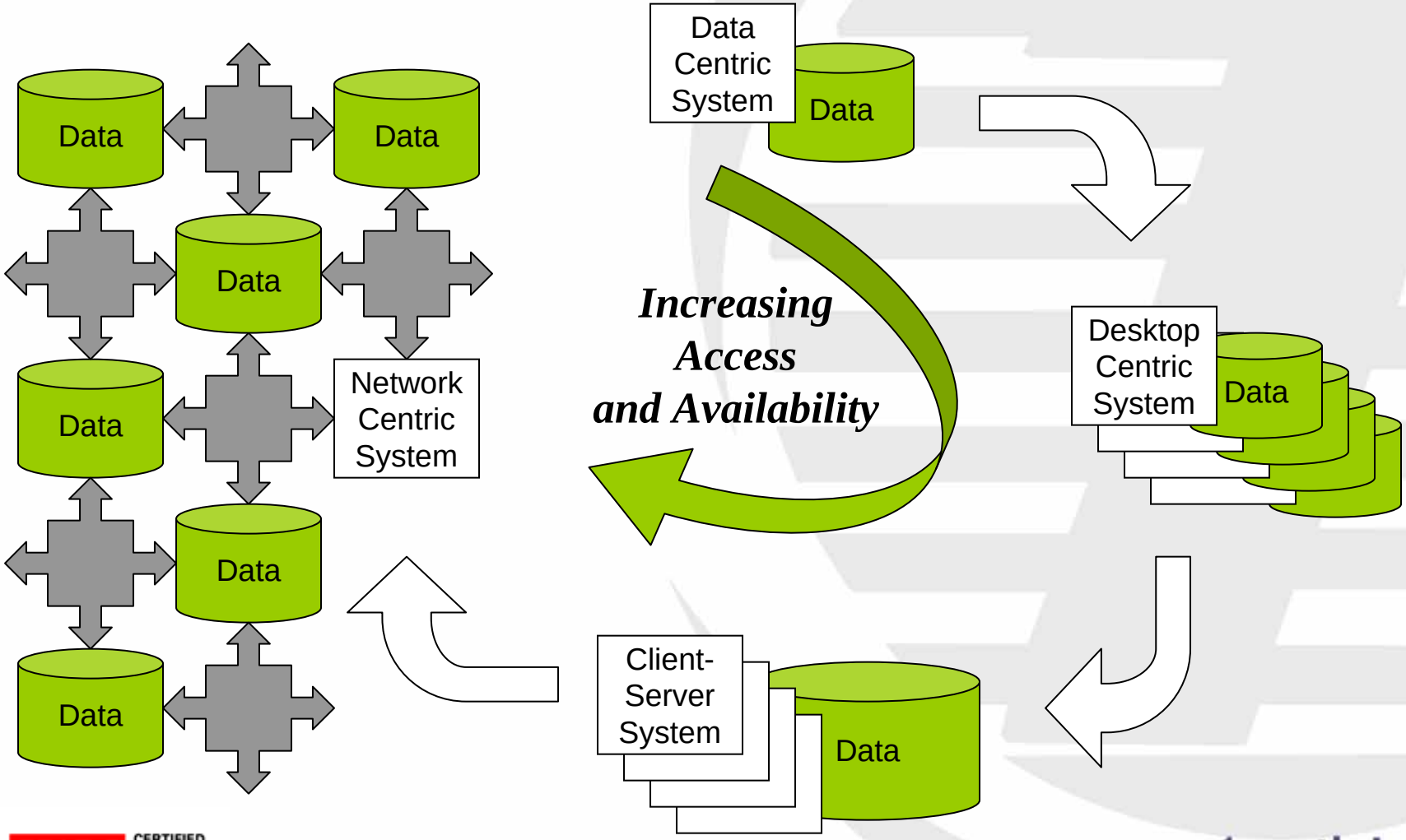
- Different Domains
  - CAD: Engineers and Designers
  - GIS: Data Integrators and Managers
- Data Sources
  - What came first, the design or the map?

CAD User

- Design Specific
  - Local frames of reference
  - File-based data storage
  - Massive data capture
  - GIS ‘Import’ procedures

... this is where GI data was before the spatial integration programmes of the last 20 years …

Data/Access Evolution



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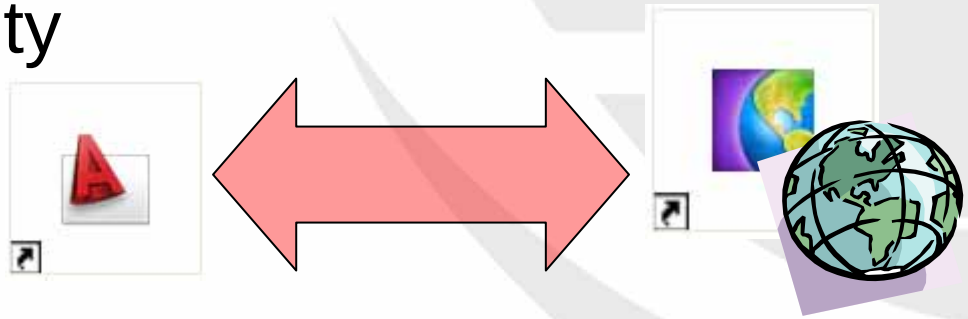
The Data/Access Symbiosis

- The Model
  - The greater the availability of data the greater the use that will be made of it
  - The greater use of data leads to a higher value
  - Higher value data can be maintained and improved from it's own revenue
  - Greater availability of data reduces point costs by economies of scale
  - Reduced costs for higher a value produce will increase access

CAD-GIS Integration

- What we desire:
  - ‘The Pervasive Map’ – a common infrastructure: One Source of Truth

- What we have:
  - Data duplication, replication, confusion and lack of integrity



CAD-GIS “Integration”

- Current Data (File) Solutions
  - Reverse-engineer into CAD-file limitations
  - Impacts resources for GIS or engineering
  - Increases data duplication and synchronisation
  - Make data spatially fit - accuracy suffers
  - Difficult to manage lineage
  - Out-of-date or from unmanaged sources
  - Possible issues undetected until affected cost

FACT

- AutoCAD is the most common platform for creating and maintaining spatial data
- AutoCAD is the least considered platform in GI strategy and integration

- This is a major problem in the corporate management of spatial data and is mismanaged through ignorance

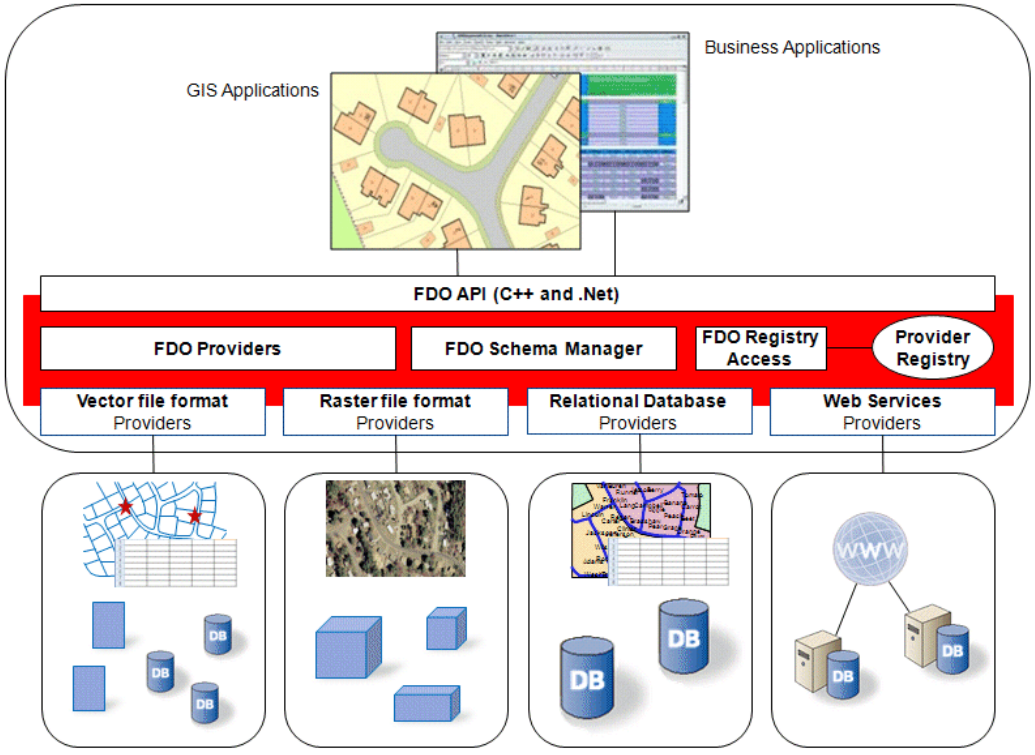
Drive to Integrate

- Solution required that is:
  - Direct
  - Entity based
  - Flexible
  - Extensible
  - Affordable
  - Based on a universal platform foundation:

FDO

FDO Platform

- Abstracted interoperability layer for spatial data:



1Spatial: MapRelate

- An AutoCAD plug-in
  - AutoCAD 2007-2009, Map, MEP and AEC
- Fully integrated
  - Native entities and layering for interchange
  - Native user interface menus, dialogs, palettes

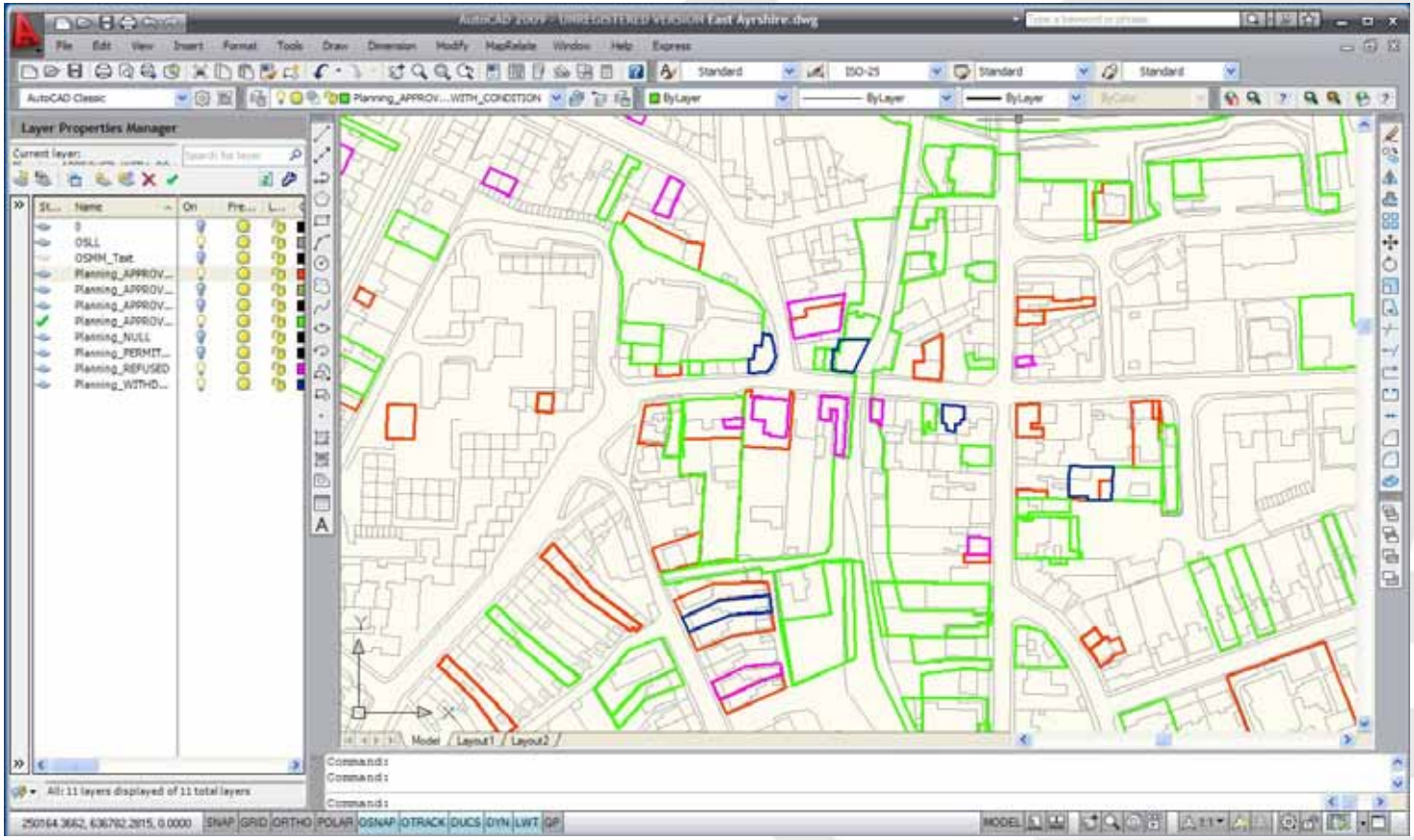
MapRelate - Features

- Easy to Install and Configure
- Data Administrator Oriented
  - GIS / data custodian configured access
  - Independent stand-alone application
  - Distributed shared access mechanism
- CAD User Oriented
  - On demand live data access
  - Local dataset customisation (on/off)
  - Designed for high-performance
    - 10,000+ entities per second achieved

MapRelate - Formats

- Based on FDO Foundation:
  - Oracle 9i, 10g and 11g SDO (with Oracle Client)
  - ESRI Shape (SHP) files
  - ArcSDE 9.1 and 9.2 (with ESRI DLL)
  - SQL Server 2008 (GEOMETRY and GEOGRAPHY)
  - Autodesk SDF files
  - ODBC datasources for points
  - GDAL/OGR Formats from Open Source
    - ESRI Personal Geodatabases, MapInfo TAB and MID/MID, GML, Google KML, WMS, etc etc…

MapRelate - User



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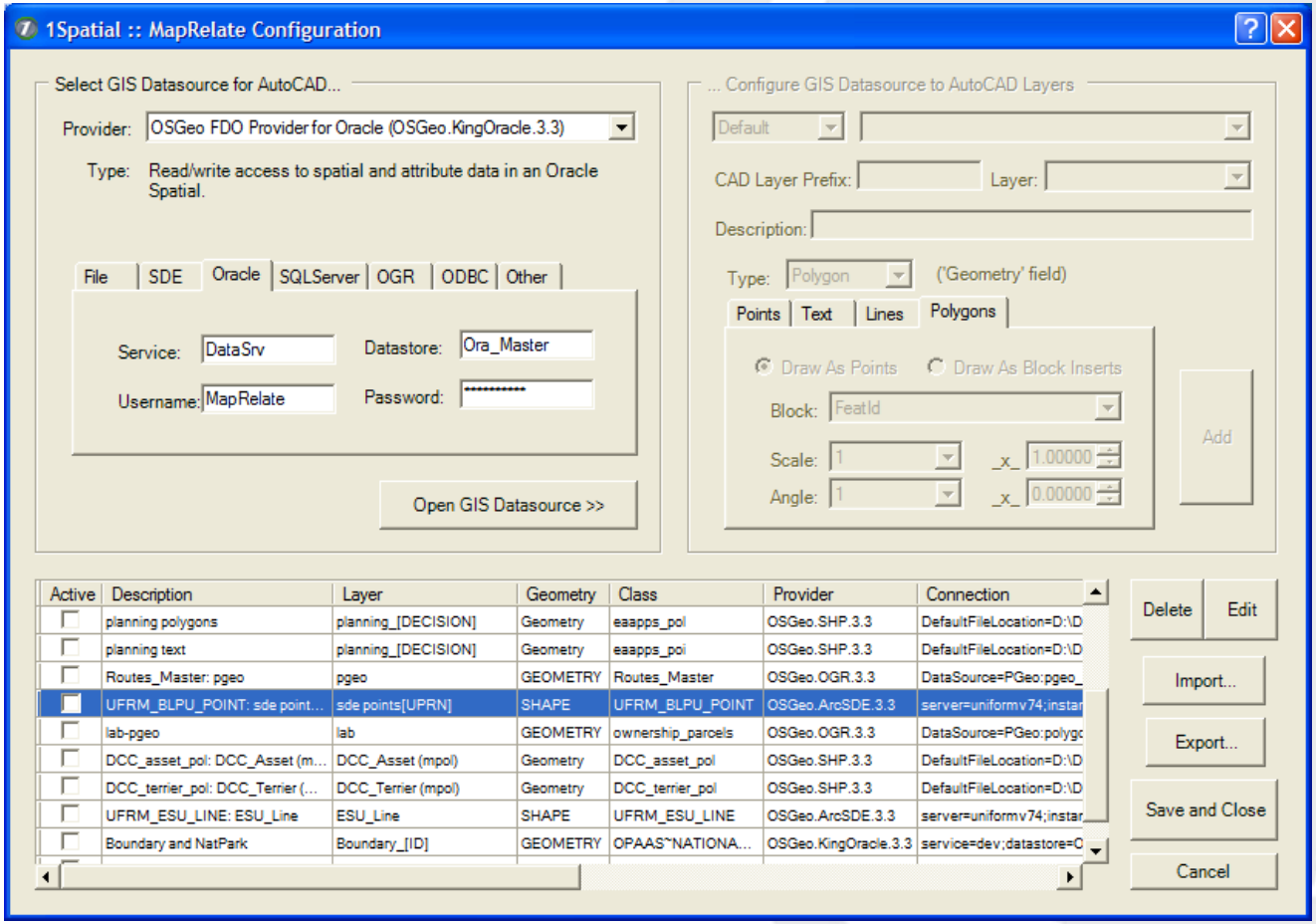
MapRelate – Admin



MapRelate: Springboard

- Platform for Greater Integration
  - Introduction for AutoCAD users in their familiar environment
  - Provides traditional CAD users with an initial stepping stone to the full power of Autodesk's geospatial AutoCAD Map 3D 2009 platform

- Autodesk's Pete Baxter, AEC Sales Director Northern Europe, said:

"We are excited about the opportunity to migrate AutoCAD users towards the full power of AutoCAD Map 3D software. This version of MapRelate will allow the AutoCAD community to gain an introduction to working with spatial data. This will enable them to understand the potential benefits of integrating CAD and GIS data as a stepping stone to the power of our AutoCAD Map 3D software."

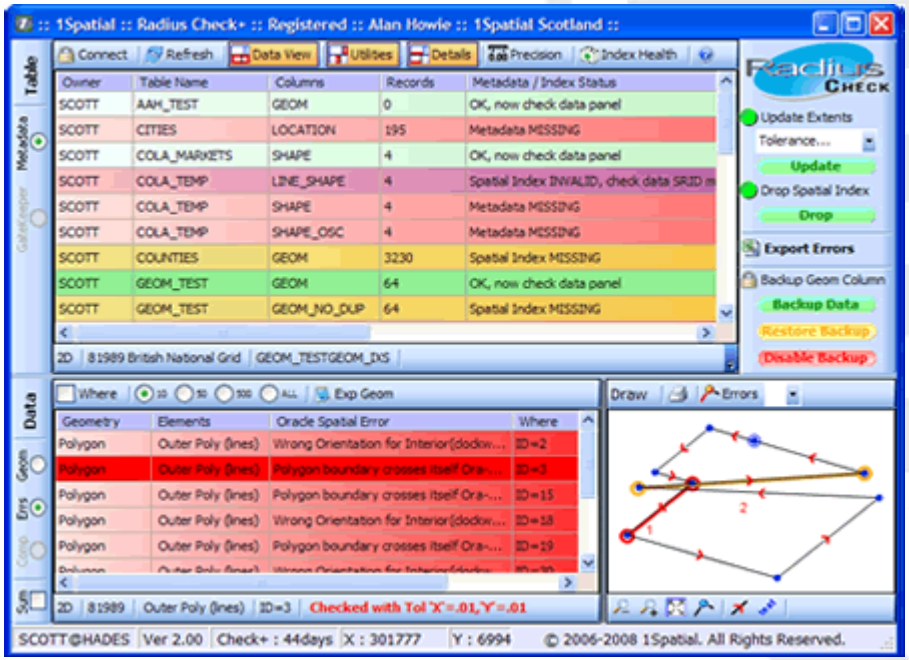
Data Management

- From managing client-side spatial data for non-GIS CAD users to…
  … managing server-side spatial data for non-GIS DBAs!

- Learning curves
  - New data types
  - Consistency with corporate database policy
  - Indexing and metadata

1Spatial: Radius Check

- FOSS4G (well, Free)
- Available Since 2007
- Oracle



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Radius Check - Needs

- Traditional DBAs ‘fear’ of the unknown (spatial geometric primitives) for maintenance, support and performance
- Traditional GIS users ‘fear’ of the unknown (Oracle) for data location and troubleshooting

- Existing data loaders are closed solutions not exposing what is happening at the database or allowing configuration changes without hard-core DBA command-line or client specific scripting

Radius Check - Features

- Data finder/miner
- Spatial context editor
  - Manage co-ordinate systems
- Spatial index manager
  - Health check, index options
- Data quality assessor
  - Assess against geometric rules
  - Visualise and report

Radius Check - Support

- Oracle
  - 9i, 10g, 11g
  - Locator, Spatial
  - XE, Standard Edition One, AS
- SQL Server 2008 (Katmai)
  - Exposing and enabling access and indexing for non-DBAs to promote the take-up and assessment of data in SQL Server in order to intelligently and rigorously judge quality and fitness for purpose the data at source before exposing to a range of clients

Benefits

- Interoperable access to data within an integrated data-centric framework can further enable:
  - Distributed Ownership
  - Improved Currency
  - Dynamic Data Views
  - Traceability and Accountability
  - Greater use of Geographic Information
  - Improved Access
  - More Thorough Analysis
  - New Applications
  - Economies of Scale
  - Integrity of Data
  - Time Savings and Resource Utilisation
  - Reduced Costs

Questions

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