ORACLE SPATIAL AT IOWA DOT

Eric Abrams – Iowa Department of Transportation

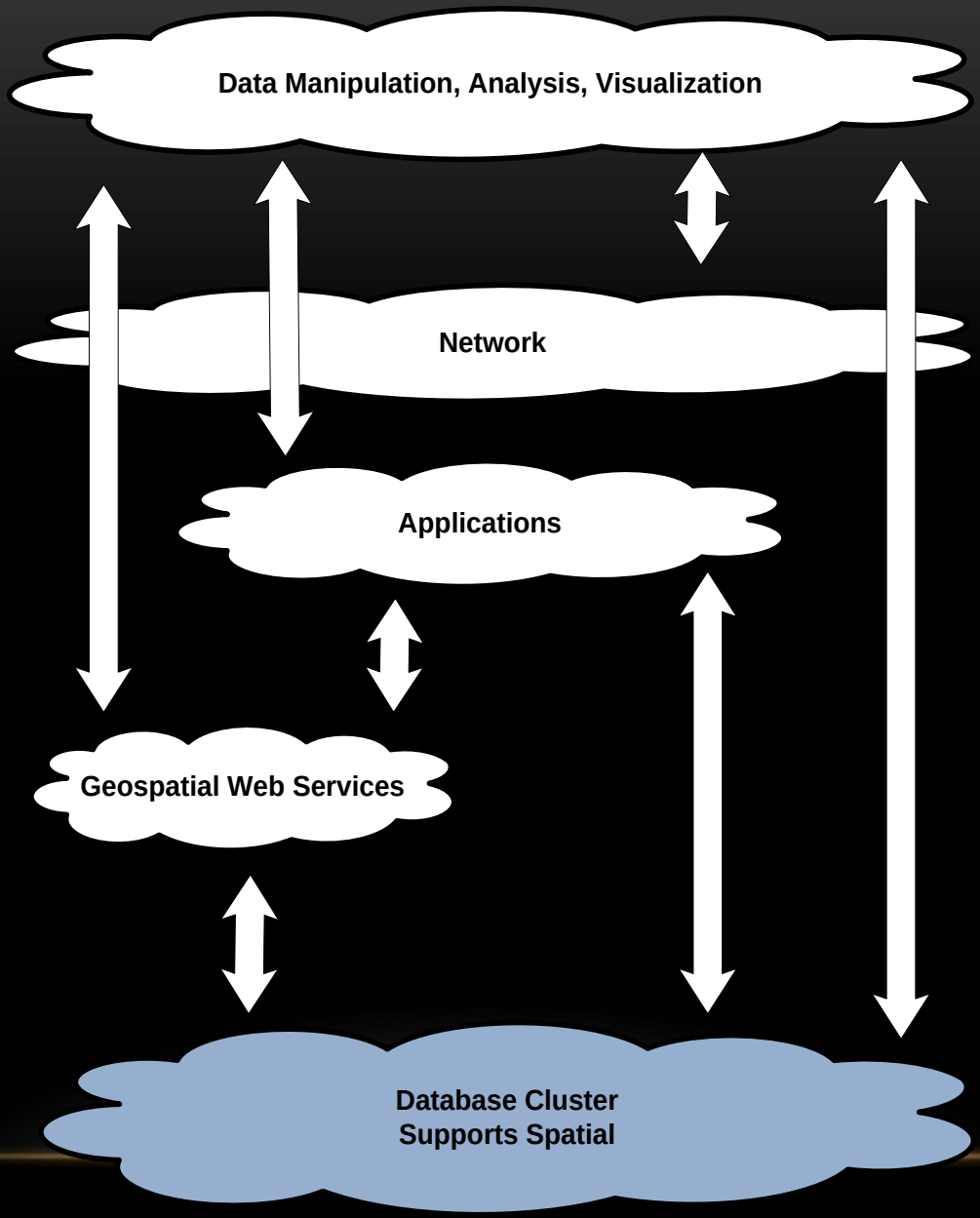
GIS-T 2012

HISTORY

- “High and Low Roads to GIS Development” Bijan Azad - Beirut, Lebanon 1997
- 1998 combine business data
  - Road data stored in IDMS
  - Centerlines Stored in MicroStation
- Deployment of centralized in MicroStation with direct connection to Oracle.
- Custom geometry type developed in Oracle to store MicroStation elements
- Preliminary LRS work started.
- 2001 adopted Oracle Spatial for LRS
- 2005 tied custom type road centerline to Oracle Spatial

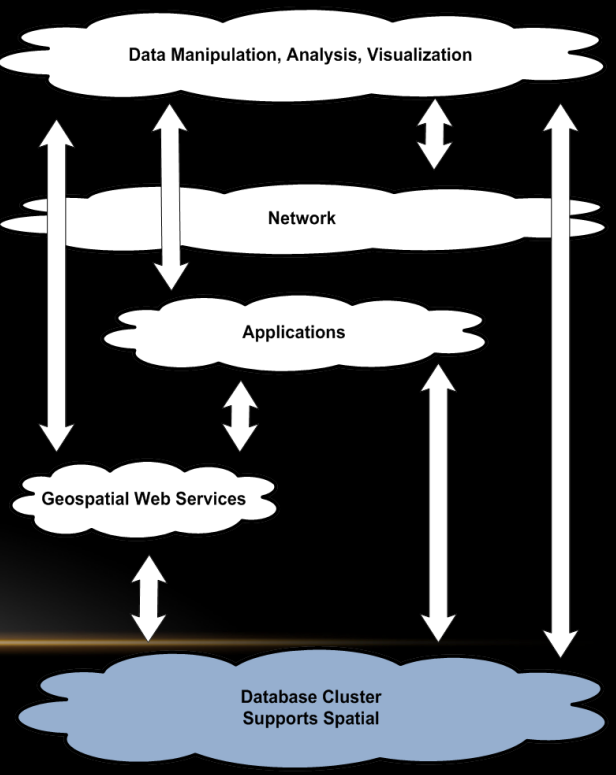
DATABASE CENTRAL, SOFTWARE NEUTRAL

- 2005 new direction to leverage Oracle Spatial
- Cohesive environment
- Integration of data common platform for storage needed
- Oracle Spatial in place; met enterprise needs
  - Leveraged by multiple software packages
  - Works with SQL, Java, etc. at IT level
  - Flexibility in development
- MUST have web services for success
- Make data once reuse many


Data Manipulation, Analysis, Visualization
Network
Applications
Geospatial Web Services
Database Cluster
Supports Spatial

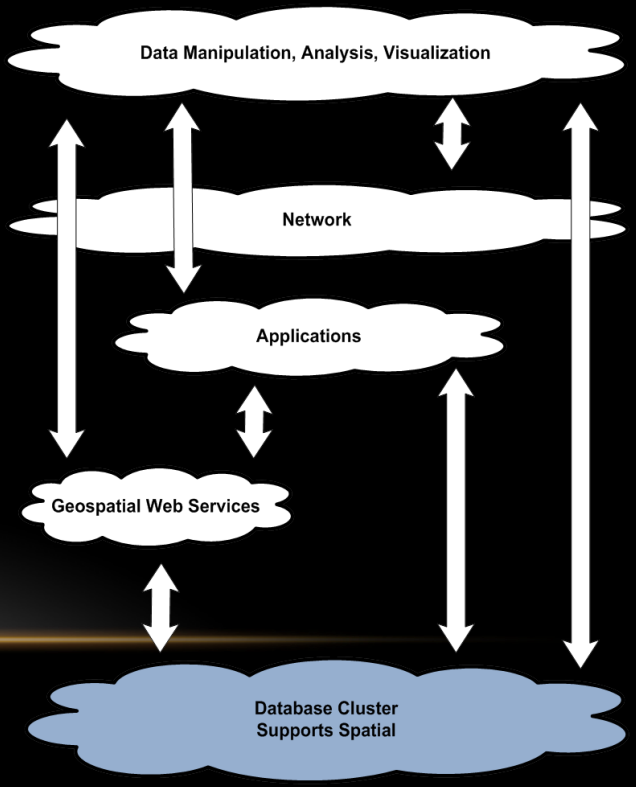
WHY IT WORKS FOR IOWA DOT

- Flexibility
- Focus on core infrastructure
- Web Services
- Leverage technology that works with core infrastructure
- Almost unlimited opportunities



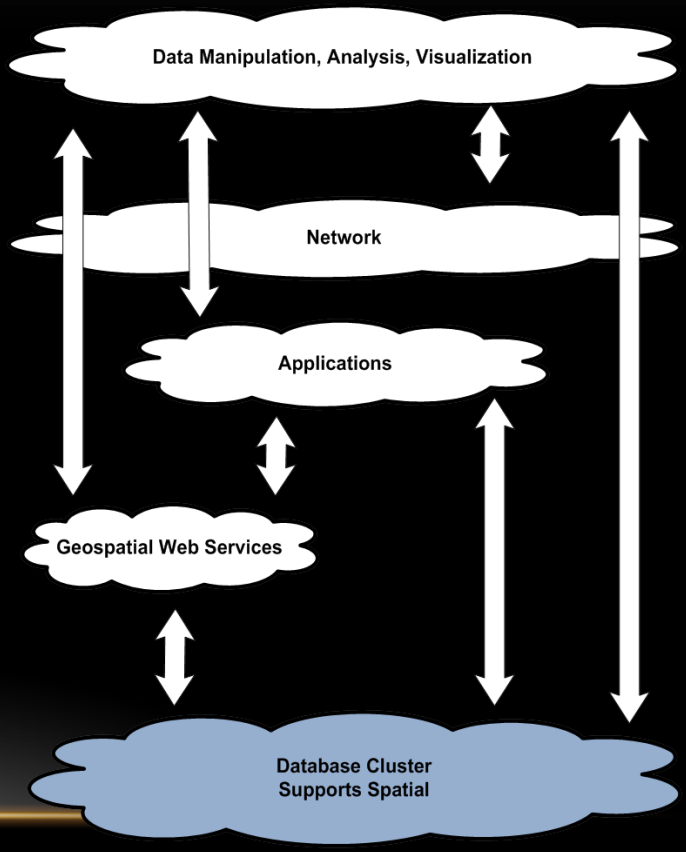
FLEXIBILITY

- Multiple instances and schemas can be created
- Tune tables, views, procedures, functions, etc at database level
  - When debugging start at DB work up to application level
- Query and analyze at any level of clouds
- Read, write, manipulate from almost anywhere and anything



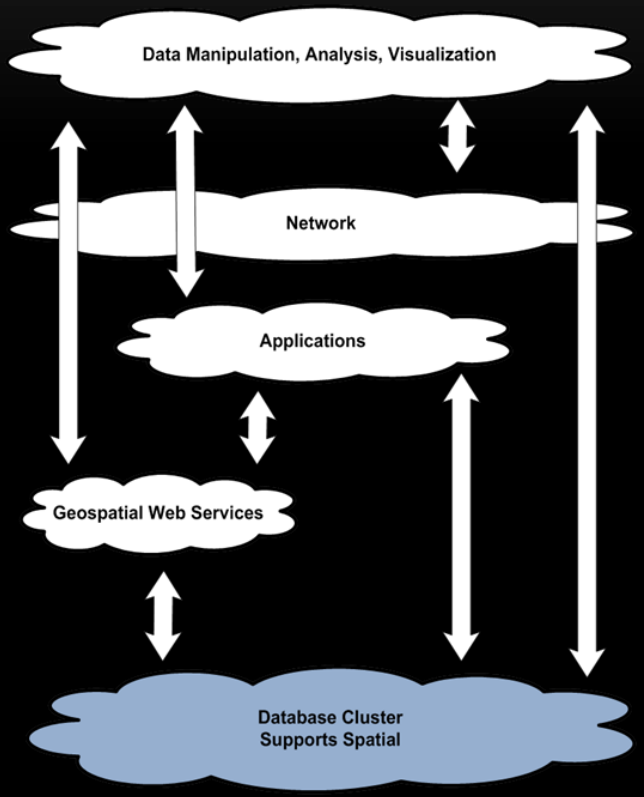
FOCUS ON CORE INFRASTRUCTURE

- IT staff build knowledge around core
- Analysts build knowledge around core
- Systems build around core
- Train in SQL, Database
- Look at core first for solutions
- Make once use many



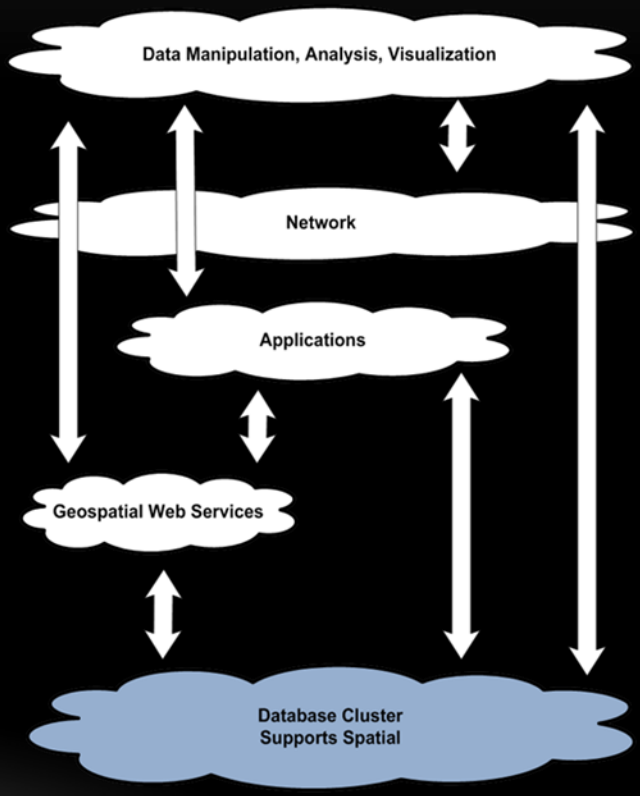
WEB SERVICES

- Leverage web based services
  - ArcGIS Server
  - Custom LRS Service (JetFire)
  - Custom Database Service (OWL)
  - Native Oracle (A3)
- Services allow other infrastructure to leverage database.
- Avoids the one off systems, silos of excellence



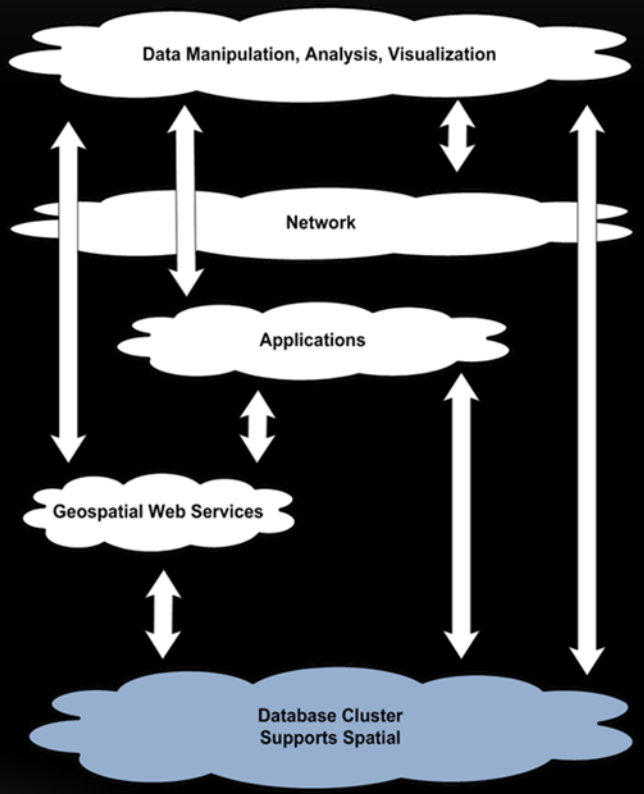
LEVERAGE TECHNOLOGY THAT WORKS WITH CORE INFRASTRUCTURE

- Leverage geospatial software that leverages direct connections or web services
- Try to avoid custom registrations, unless they are easy
- Don’t let software dictate design, let workflow dictate
- Work with Oracle Spatial natively



ALMOST UNLIMITED OPPORTUNITIES

- DB to Desktop
- DB to web
- DB to desktop and web
- DB to desktop and application
- Solid foundation, build anything



LOOK OUT FOR

- One Off Systems
- I like to have my own files
- Give users access on system
- Training
- Need local experts
- Need database experts

CURRENT IOWA INFRASTRUCTURE

- Oracle Enterprise 11.1 and 11.2 plus spatial on multiple servers and instances
  - 5 Oracle Enterprise Production Licenses
  - 3 Oracle Enterprise Test Licenses
  - 3 Test and Production Spatial licenses
- Oracle locator
  - ERMS, Terra Share
- Large investment upfront
- Desktop software leverages architecture GeoMedia, ESRI, transCAD, MicroStation
- Server software, ArcGIS Server, LDMx, Quick Terrain Modeler
- Iowa MLLRS runs in Oracle Spatial

DATA REGISTRATION IS NEEDED

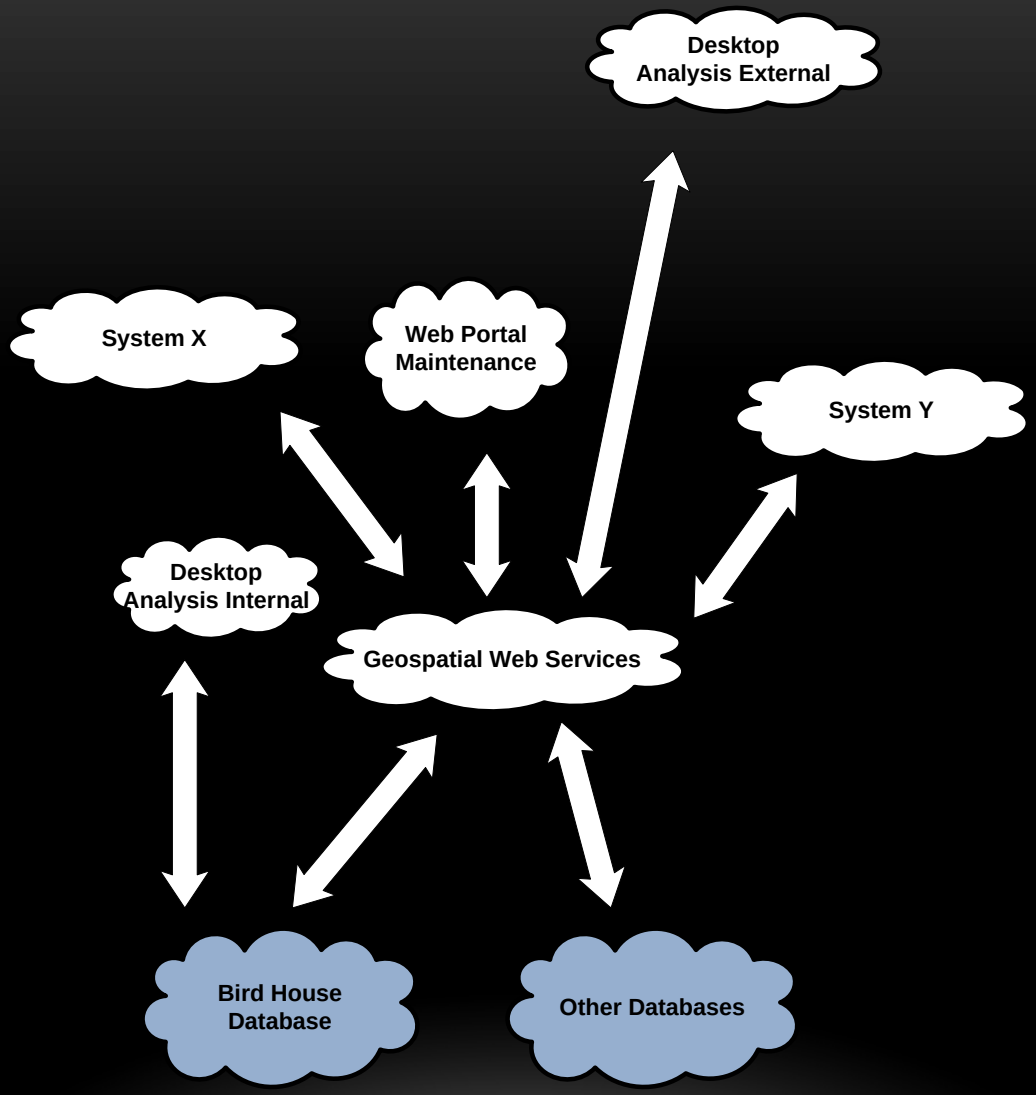
- Tables developed in Oracle
  - If business in SQL Server, store geometry in Oracle Spatial
  - Appropriate roles, permissions
  - Universal GIS Select role
- Follow best practices for spatial development
- Register with MDSYS and create spatial indexes
- Register with GDOSYS
- Register with SDE
  - Don’t violate ESRIs Oracle spatial rules
  - Query layers? Looks promising
- Ready for use & reuse

STAFF ACCESS

- OS Authentication for users
- Service accounts for specific needs like SDE, custom direct access
- Users allowed create objects in own schema
  - Limit on space
  - Most don’t leverage

EXAMPLE - BIRD HOUSES

- Store locations of bird houses
- Web portal for maintenance staff
- Analysis by internal staff
- Analysis by external staff
- Web service for use by other applications


Desktop
Analysis External
System X
Web Portal
Maintenance
System Y
Desktop
Analysis Internal
Geospatial Web Services
Bird House
Database
Other Databases

NATIVE QUERIES

- select distinct full_name from IDOTLRS.ROUTE_DETAIL where route_system_id = 1 and sdo_relate (geometry_ga_tw, (SELECT SDO_CS.TRANSFORM(SDO_GEOMETRY(XMLType(httpuritype (httpuritype ('http://owl/wcf/1.0/Owl.svc/pox/GetCountyBorderWkt?coNum=25\&year=2007').getExternalUrl()).getClob()).EXTRACT('//WKT/text()').getClobVal() , 8192), 1050010) FROM DUAL), 'mask=ANYINTERACT querytype=WINDOW') = 'TRUE' order by full_name;
- select sys.***dbms_xmlgen.getxml***('select distinct full_name from IDOTLRS.ROUTE_DETAIL where route_system_id = 1 and sdo_relate (geometry_ga_tw, (SELECT SDO_CS.TRANSFORM(SDO_GEOMETRY(XMLType(httpuritype (httpuritype "http://owl/wcf/1.0/Owl.svc/pox/GetCountyBorderWkt?coNum=25\&year=2007").getExternalUrl()).getClob()).EXTRACT("//WKT/text()").getClobVal() , 8192), 1050010) FROM DUAL), "mask=ANYINTERACT querytype=WINDOW") = "TRUE" order by full_name') xml from dual;
- select sys.***dbms_xmlgen.getxml***('select POST_VALUE from IDOTLRS.REFERENCE_POST where ROUTE_ID = 16 and COUNTY_ID = 51 order by POST_VALUE') XML from dual;

DOLLAR WATERMELONS

- Does your architecture meet the mission of your organization?

QUESTIONS