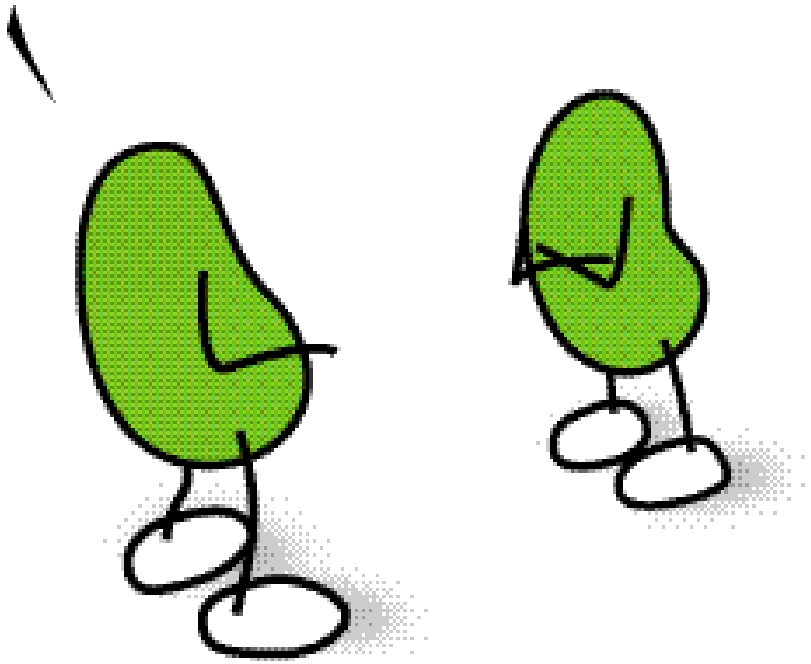
Gli Indirizzi.
Architetture di sistema e soluzioni applicative.

Addresses.
System Architectures and Solutions

Andrea Fiduccia
Intergraph Italia LLC
Security, Government and Infrastructure

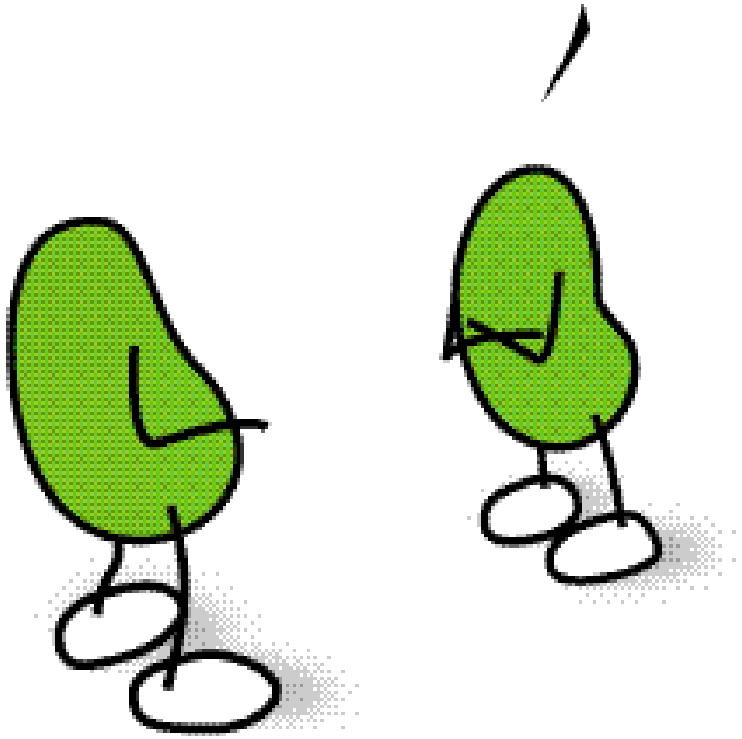
The Problem

Sorry Sir: where is **103, Monti di Creta Street**?



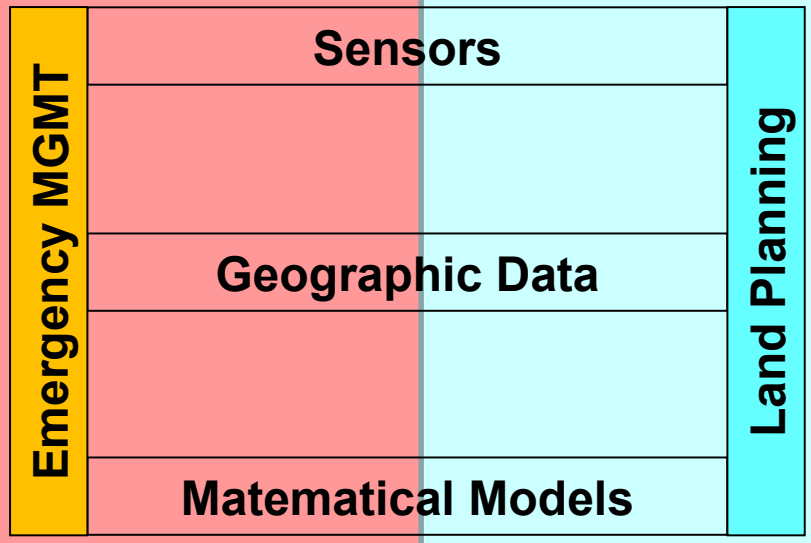
The Problem

I don't Know. But I know where is **Via dei Monti di Creta n. 103**.



Geospatial Technology: not only GIS...

- ***5-9*** Reliability 99.999%
- ***5-R*** Right information, delivered at the right time, at the right place in the right format, to the right person



- Topographic Precision
- Cartographic Rendering
- Data Upgrading
- Interoperability

CAD Computer Aided Dispatching

CROP Common Relevant Operational Picture

GIS/RS Geographical Information System/ Remote Sensing SW

SDI Spatial Data Infrastructure

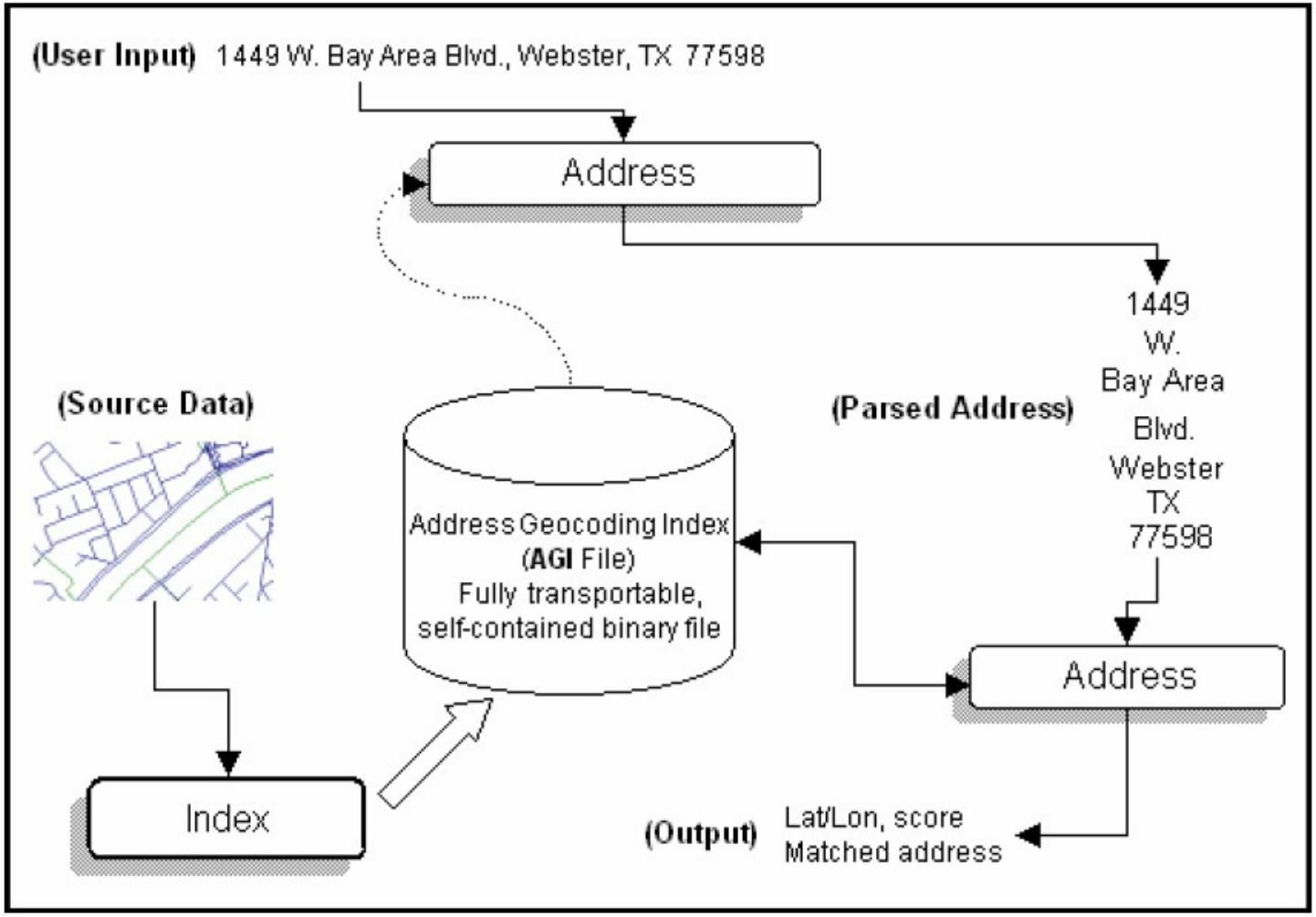
OGC WxS

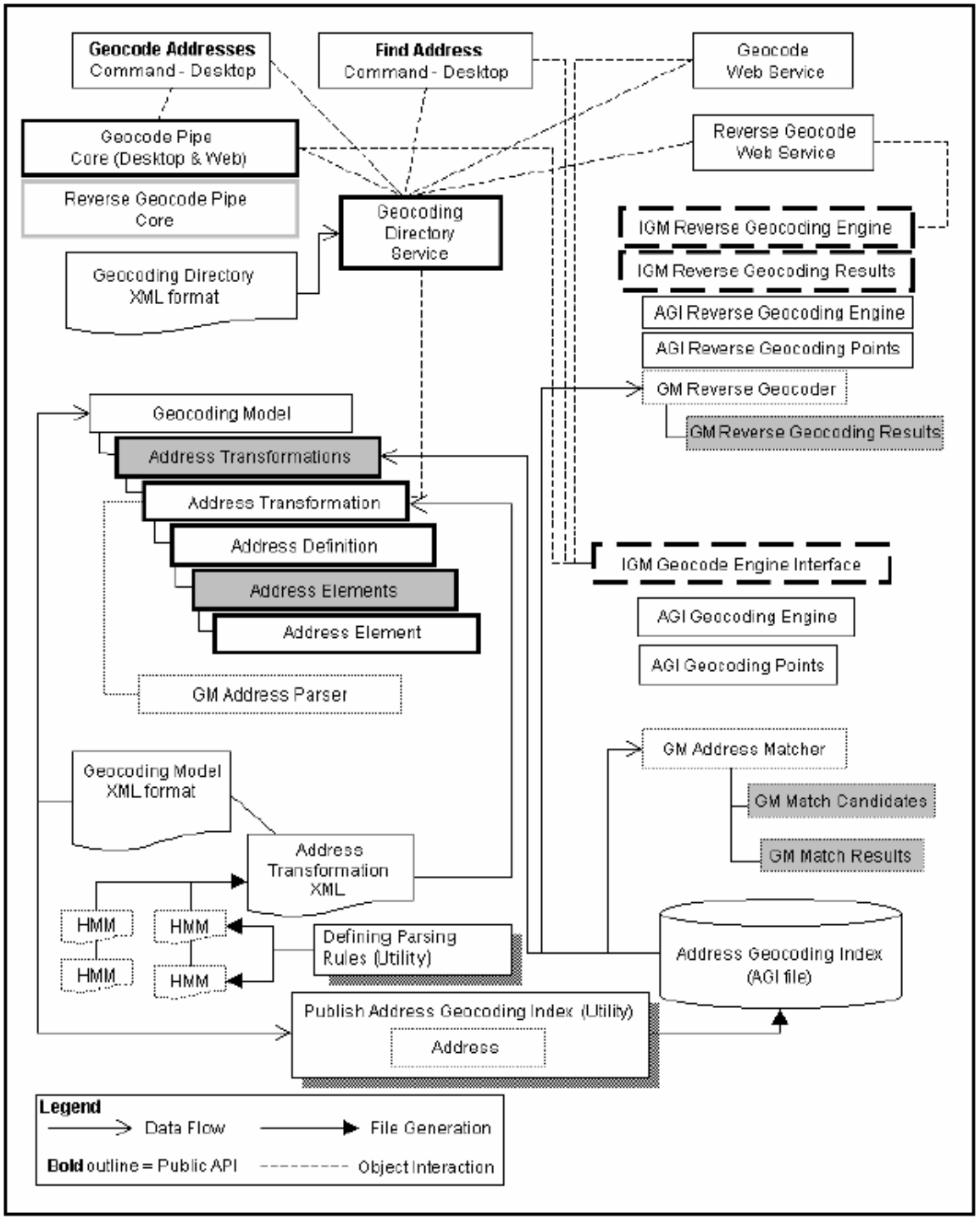
GIS/Spatial Data Infrastructure

INTERGRAPH

Address Geocoding Model in GeoMedia Technology

- A generic pourpose approach for GIS



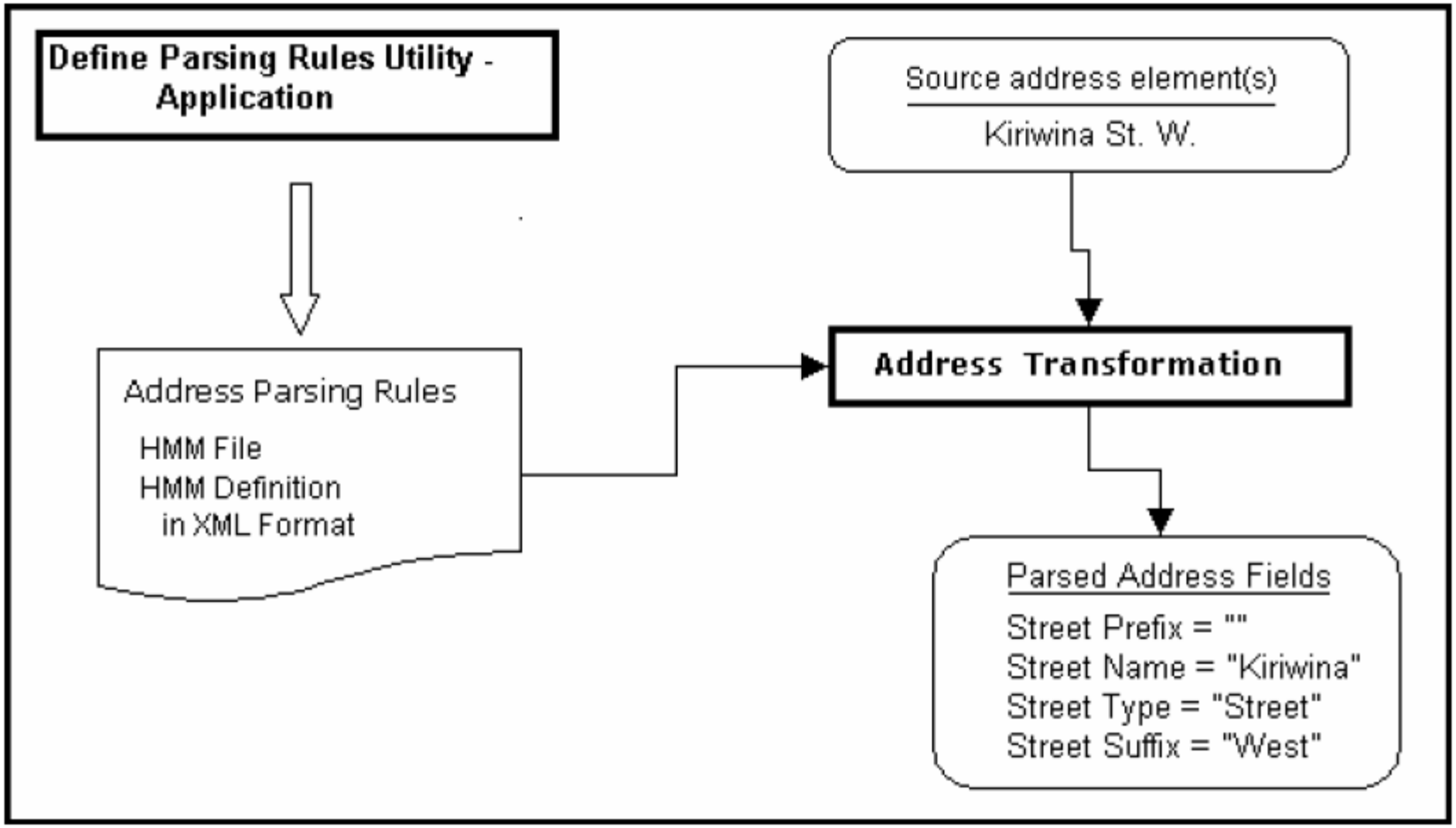


- The overall design of the GeoMedia geocoding system, as represented by the components in the diagram, can be broken down into several distinct families:
- **Address Geocoding Index components**—Generate **datasets** for geocoding and reverse geocoding.
- **Geocoding Model components**—Generate **rules** for performing geocoding according to dataset address configuration, input data configuration, and locale-specific addressing rules.
- **Address Transformation components**—Describe the **schema** of incoming or outgoing addresses, both the elements of the addresses and their storage normalization.
- **Geocoding components**—Perform **geocoding** using input address elements already parsed and transformed into the format required for the dataset.
- **Reverse Geocoding components**—Perform **reverse geocoding** using an input coordinates and address transformation rules.
- Within these families are found several different types of components:
  - Data components
  - Configuration components
  - Software components (services, pipes, commands, utilities, and web services)

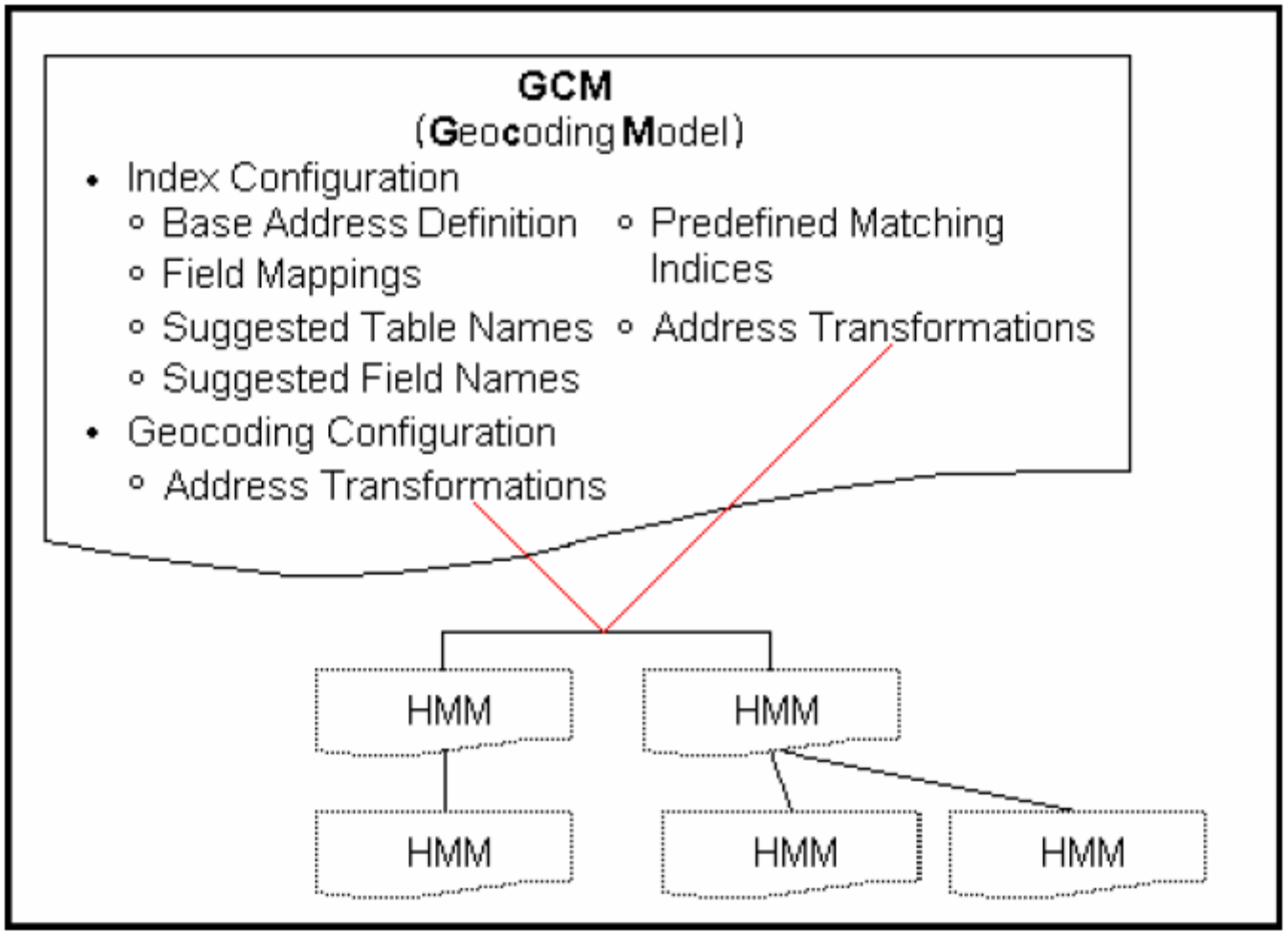
Address Geocoding Model in GeoMedia Technology

- The first thing that must be determined is what constitutes an address for a given geocoding action. An address is made up of a number of elements, and the geocoding system includes components that can recognize a textual input structure and determine the elements of the address. The parsing technique uses a state recognition algorithm based on the *Hidden Markov Modelling (HMM).*
- *The* ***Define Parsing Rules utility*** builds and tests the XML-formatted file that describes an address parsing rules in terms of an HMM. For higher-order address constructs, address parsing rules can reference other parsing rules.

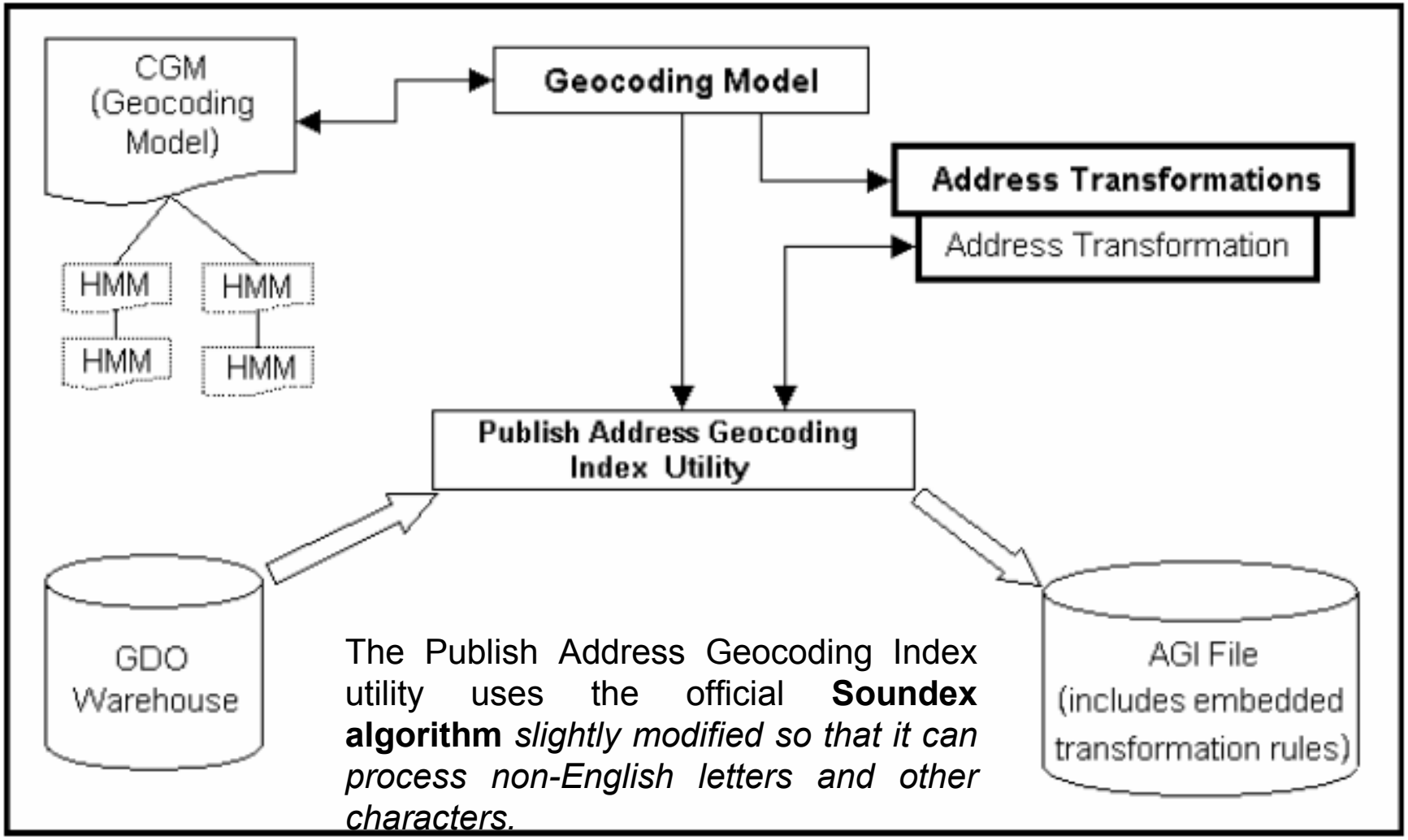
Address Transformations



Geocoding Model (GCM)

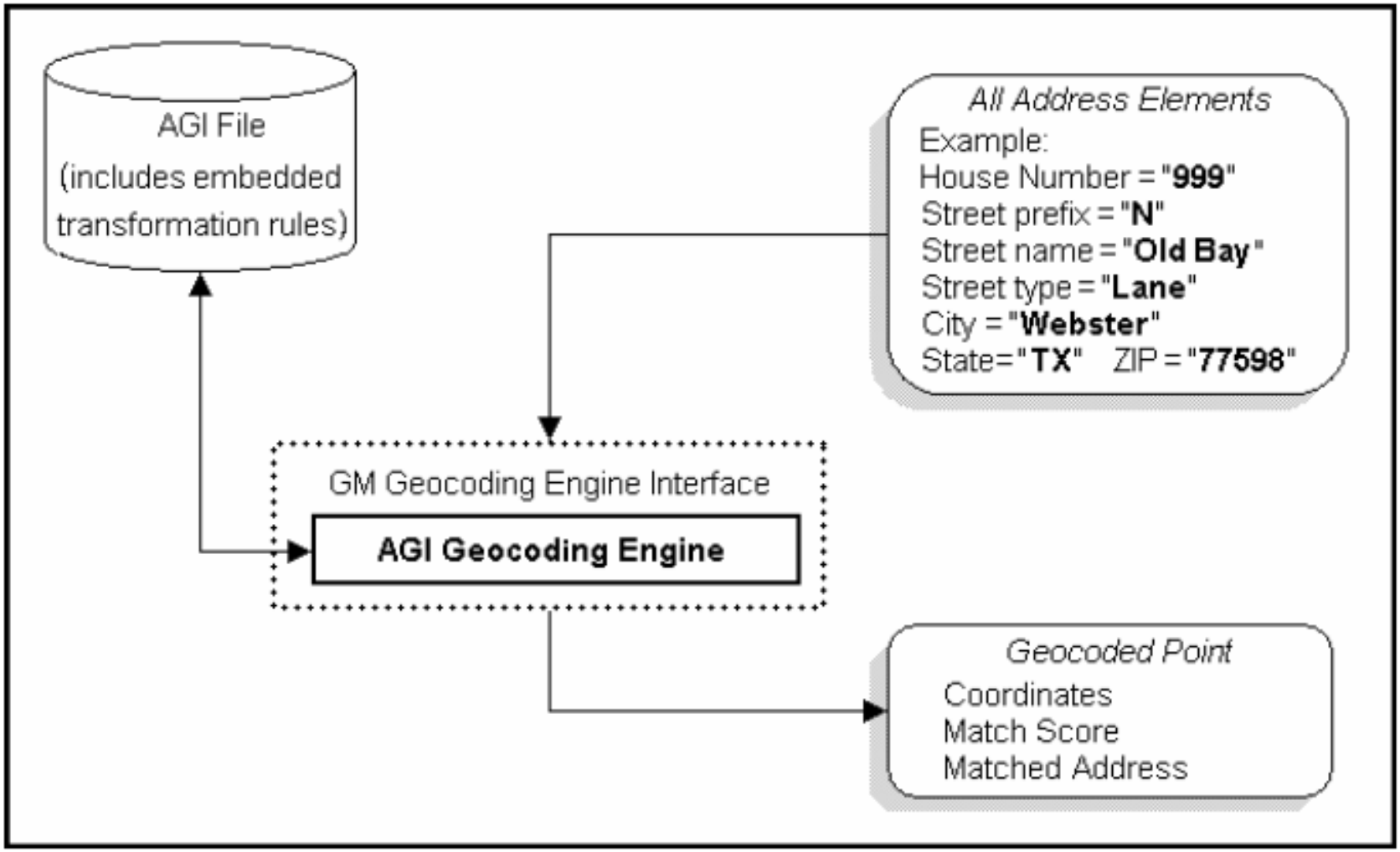


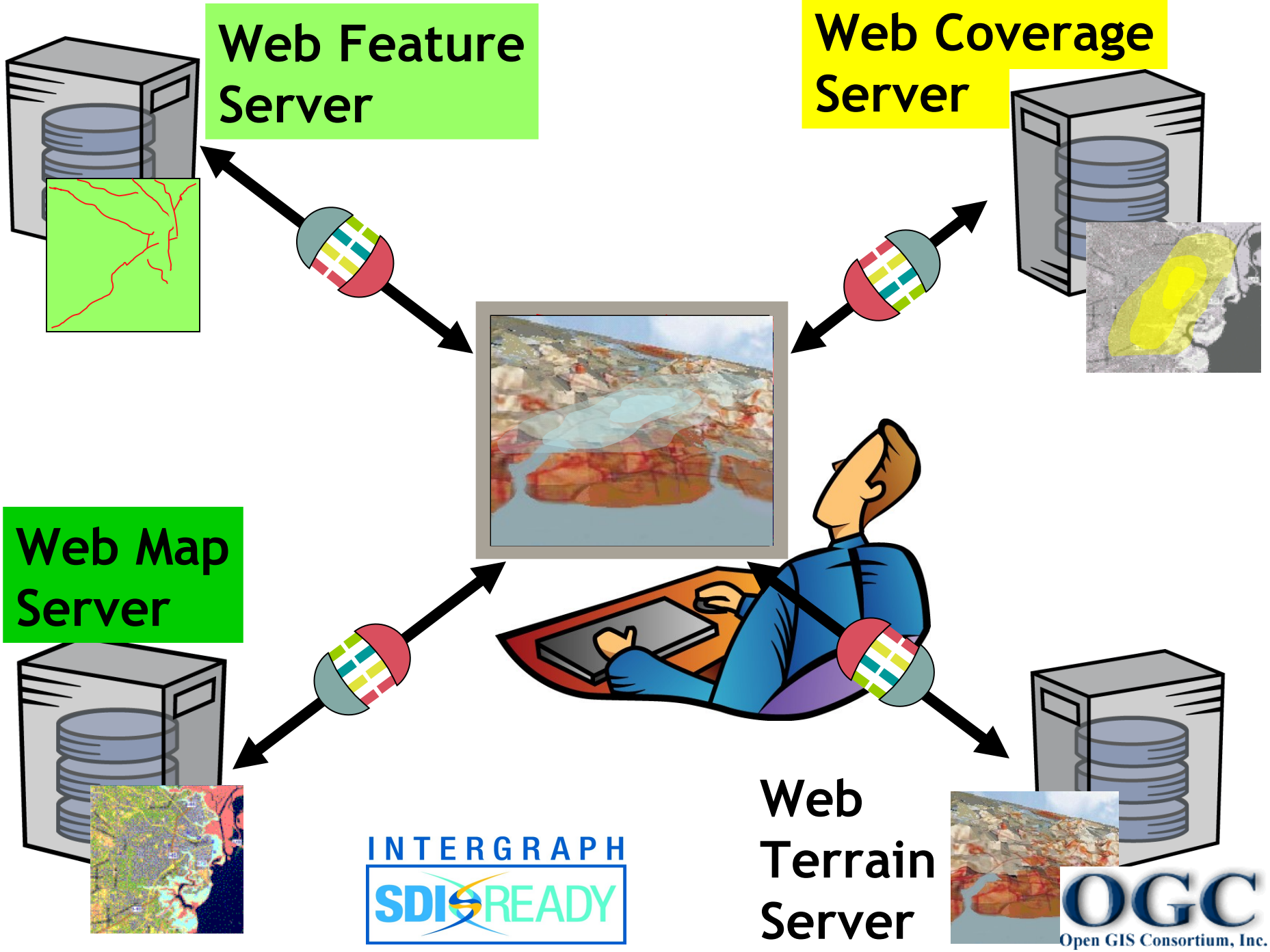
Index Building



The Publish Address Geocoding Index utility uses the official **Soundex algorithm** *slightly modified so that it can process non-English letters and other characters.*

Address Matching




Web Feature Server
Web Coverage Server
Web Map Server
Web Terrain Server
INTERGRAPH
SDI READY
OGC
Open GIS Consortium, Inc.

Spatial data servers with OpenGIS metadata and interfaces

Data Catalogs

Registered geodata metadata

Metadata for a feature collection, and a URL
Metadata for a feature collection, and a URL
Me
Me
Me
Me
Me

Registered geodata metadata

Metadata for a feature collection, and a URL
Metadata for a feature collection, and a URL
Me
Me
Me
Me
Me

Registered geodata metadata

Metadata for a feature collection, and a URL
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adata for a feature collection, and a URL
..

URL

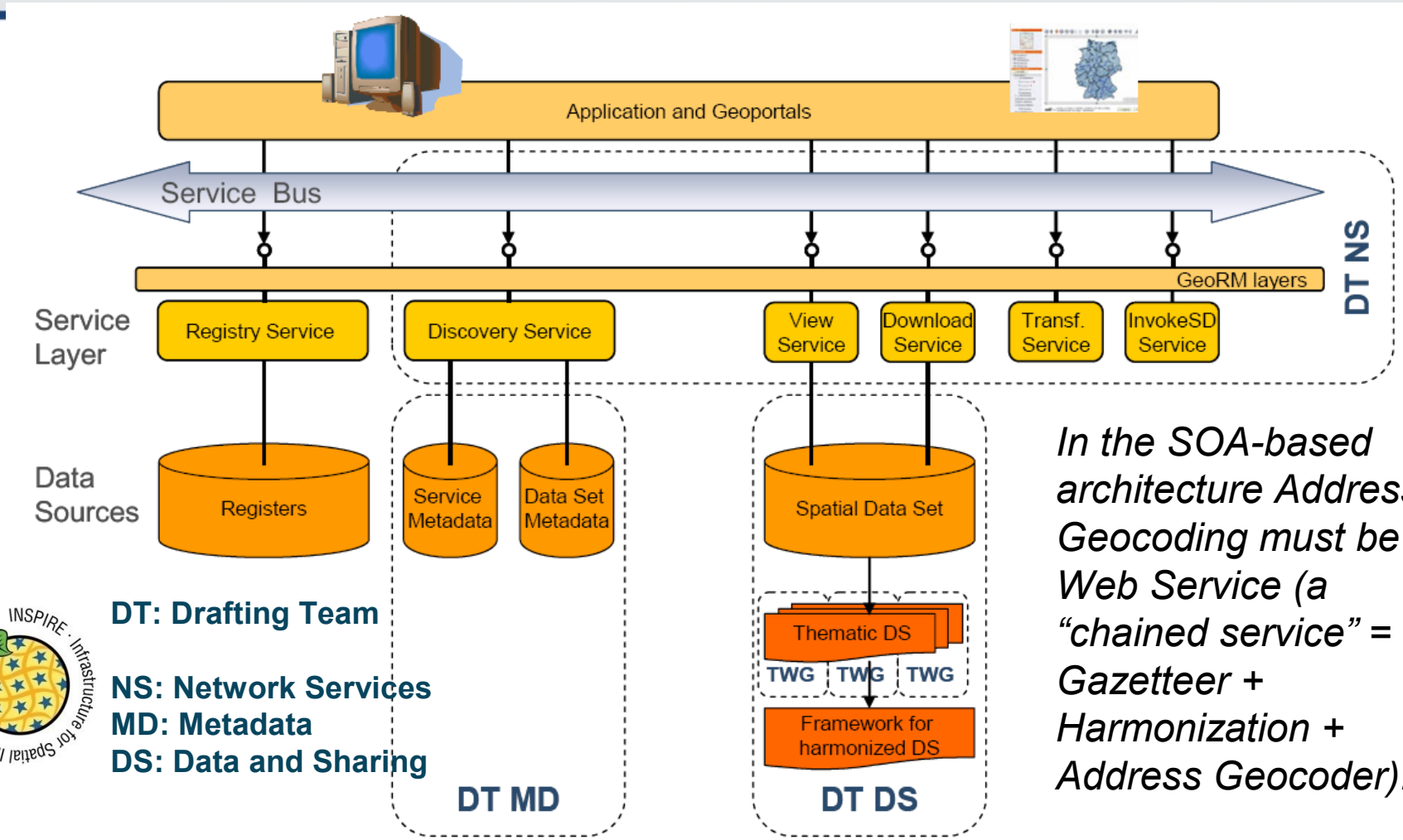
Where?
When?
How?
What?
Who?
Why?

INTERGRAPH

SDI READY

OGC
Open GIS Consortium, Inc.

INSPIRE technical architecture overview



DT: Drafting Team

NS: Network Services
MD: Metadata
DS: Data and Sharing

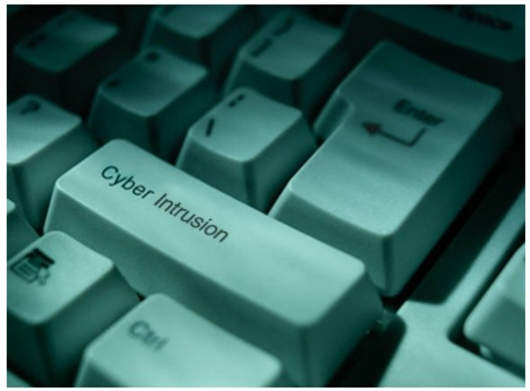
In the SOA-based architecture Address Geocoding must be a Web Service (a "chained service" = Gazetteer + Harmonization + Address Geocoder)...

Source: http://www.ec-gis.org/inspire/reports/ImplementingRules/network/INSPIRETechnicalArchitectureOverview_v1.2.pdf

SDI are vulnerable to Cyber Attacks?

- Critical infrastructure systems like electricity, water, and transportation and SDIs, are vital to our daily lives
- Attacks have caused significant equipment and environmental impacts, including deaths
- Critical infrastructure legacy systems were not designed with cyber security in mind
- Newer systems like SDIs will be more distributed and interconnected

Cyber attacks are often not easily recognized



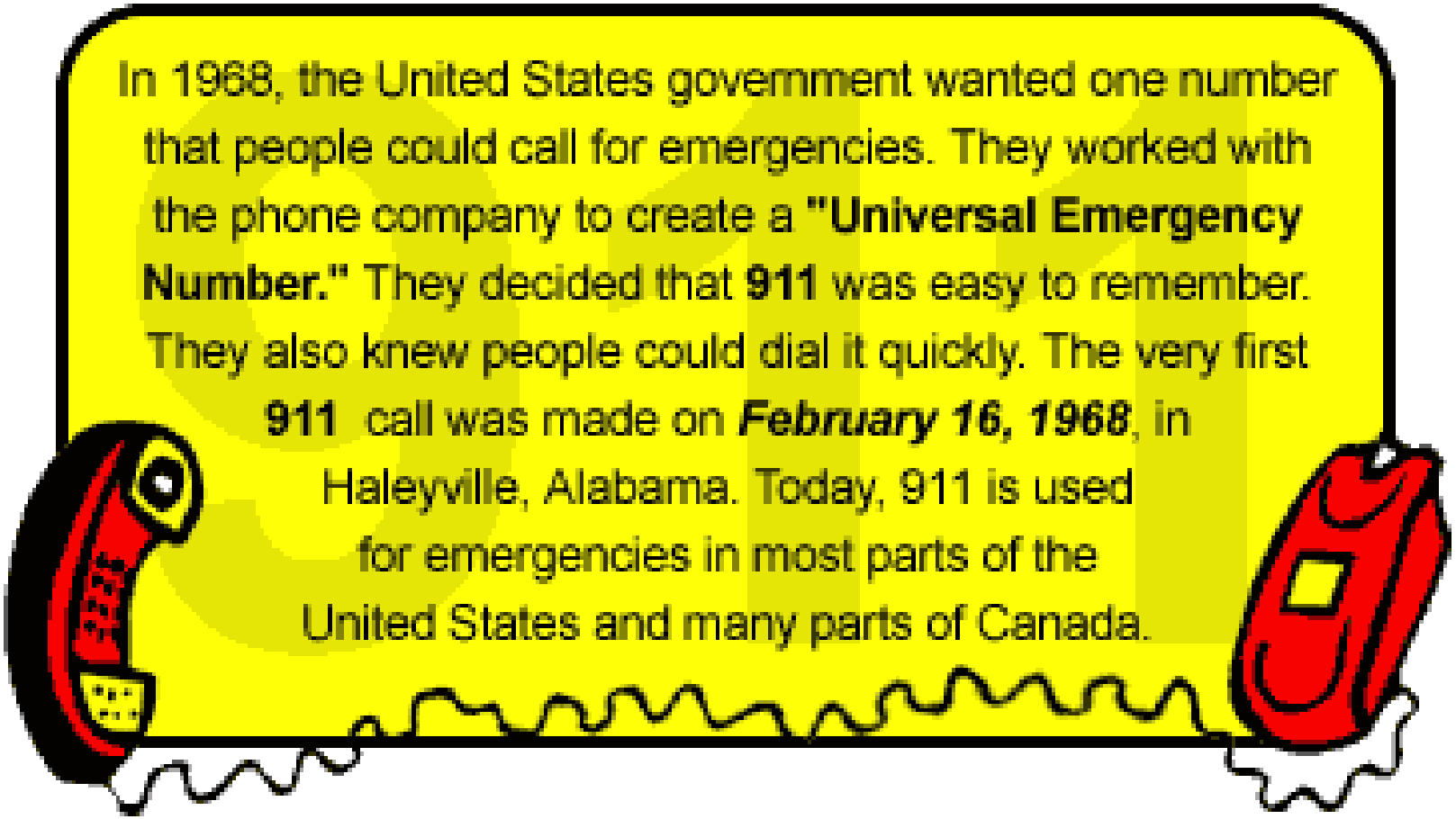
Emergency Management

Computer Aided Dispatching Systems and 9-1-1 Paradigm

INTERGRAPH

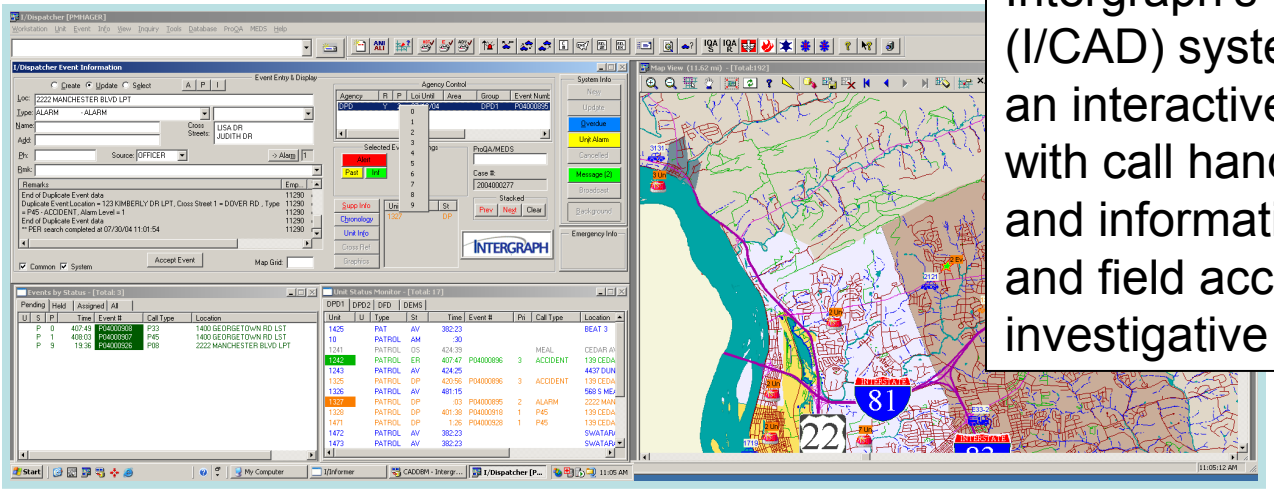
9-1-1

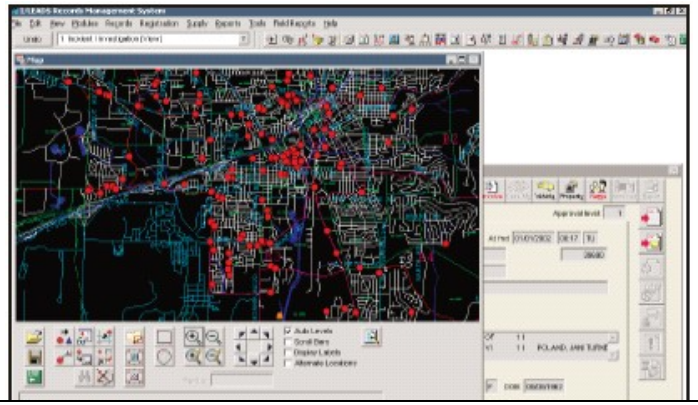
INTERGRAPH



Computer Aided Dispatching

Intergraph's Computer-Aided Dispatch (I/CAD) system seamlessly integrates an interactive, real-time map display with call handling, dispatching, records and information management, remote and field access, data analysis, and investigative tools.

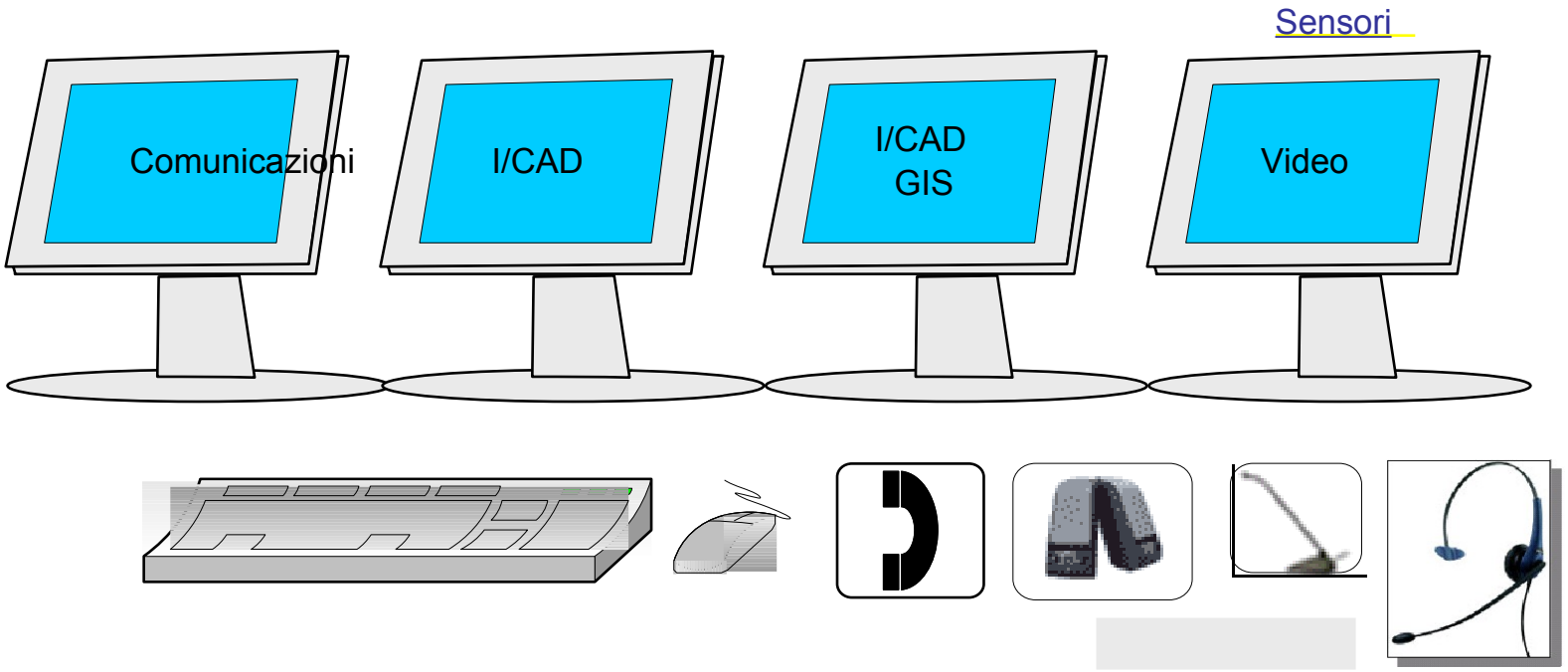




Call takers, dispatchers, and other authorized users have access to a real-time map, depicting response vehicle locations as well as the events to which they are responding. The real-time display allows dispatchers to locate, filter, and route calls for service

Field personnel can update details of an incident, access local and national databases, and send and receive text messages via in-vehicle terminals, handheld devices, or radio handsets.

Dispatcher



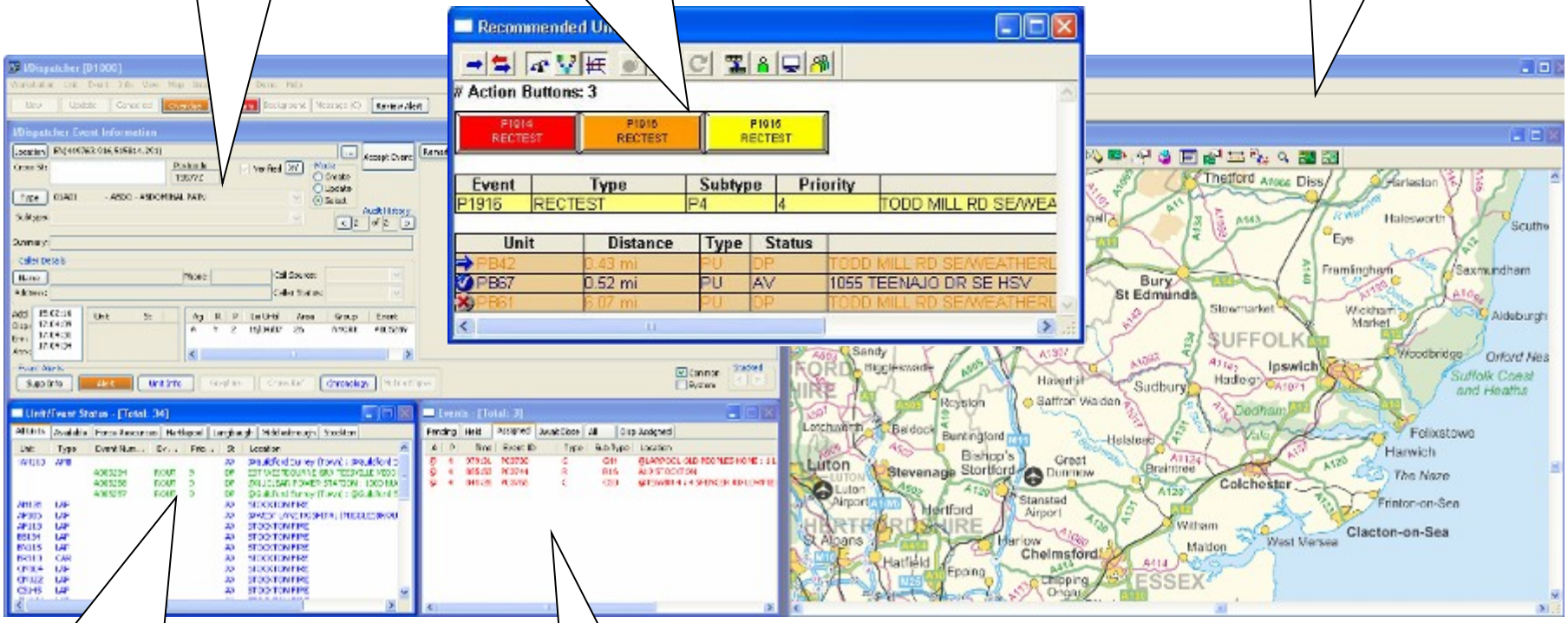
Dispatch workspace

Intergraph I/CAD

Incident Information Form

Real-Time Allocation Monitor

Map View

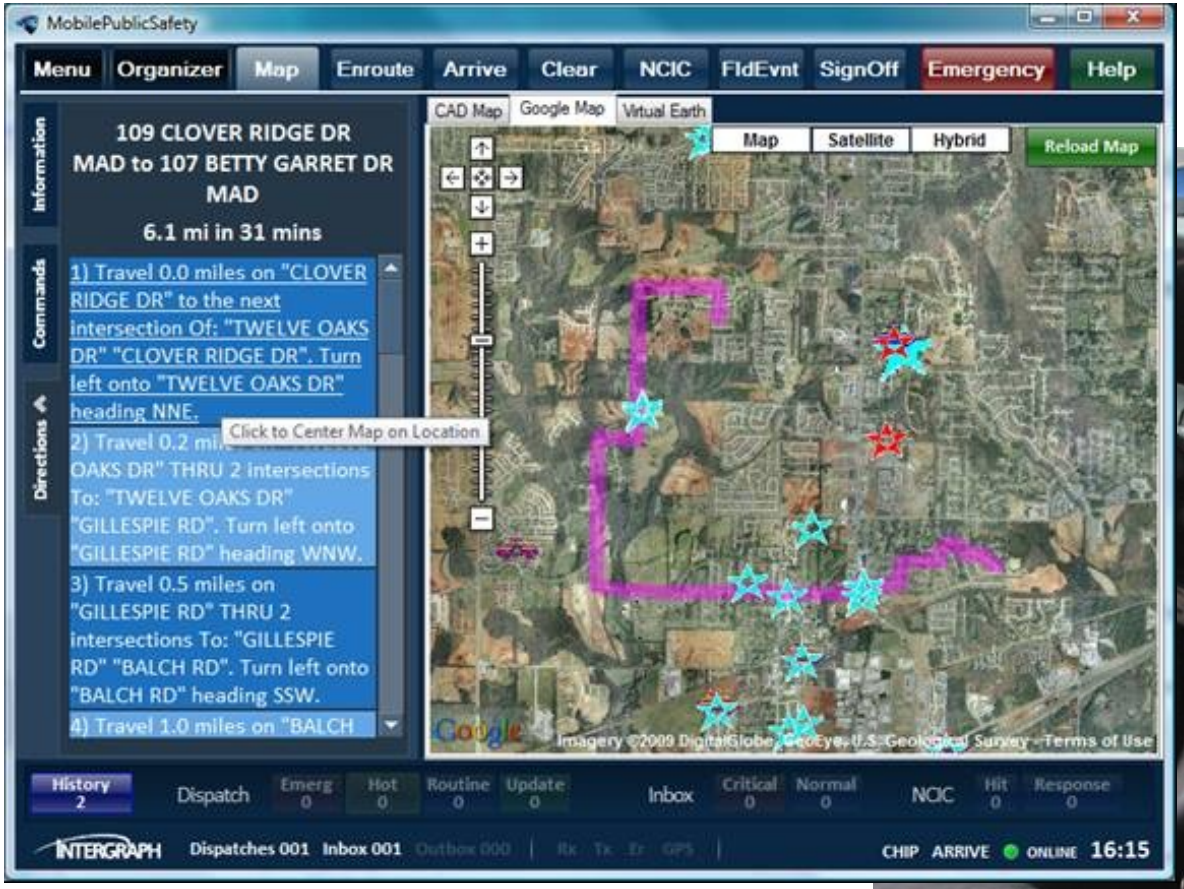


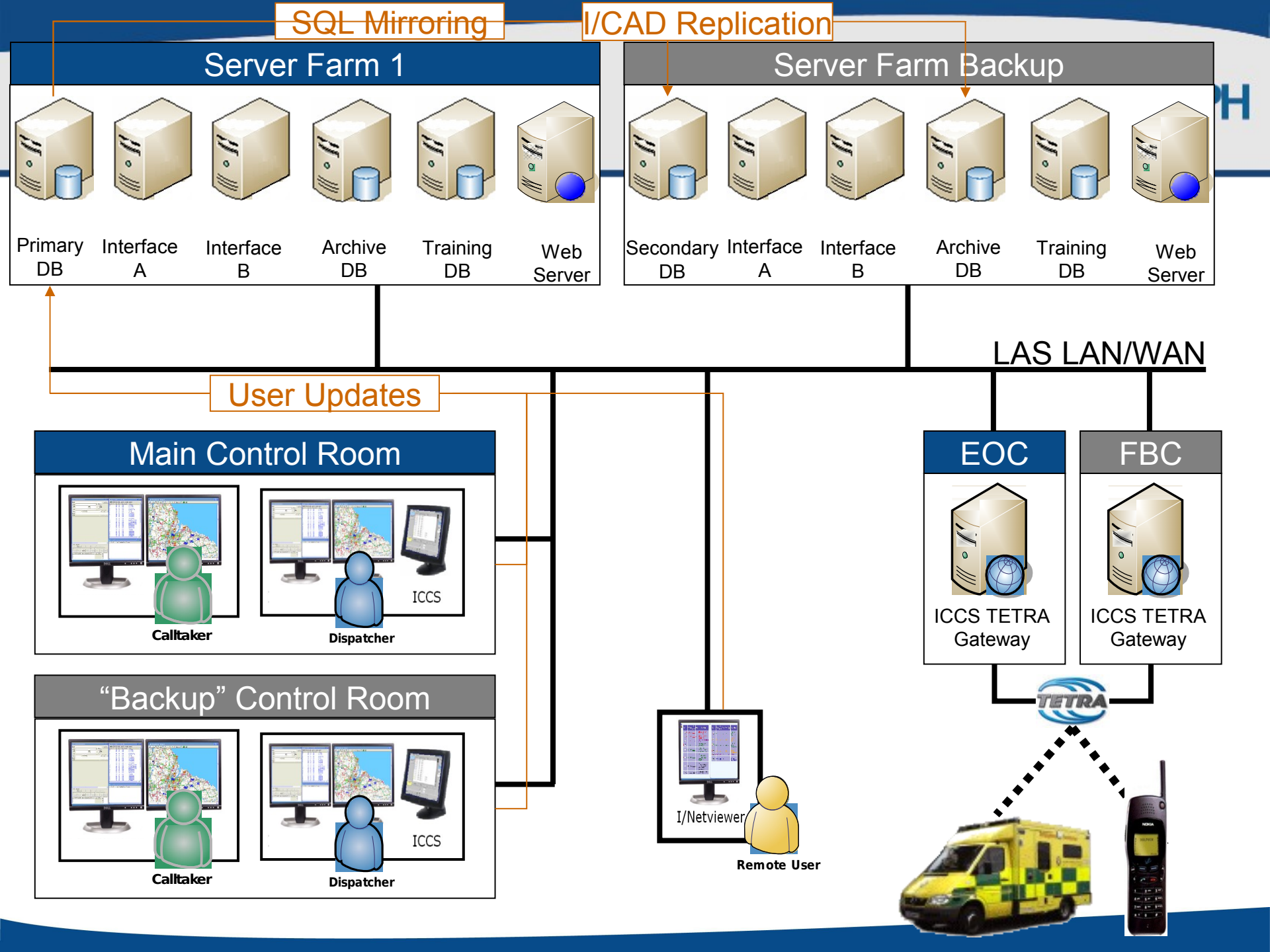
Resources and Resource/Event allocation

Events

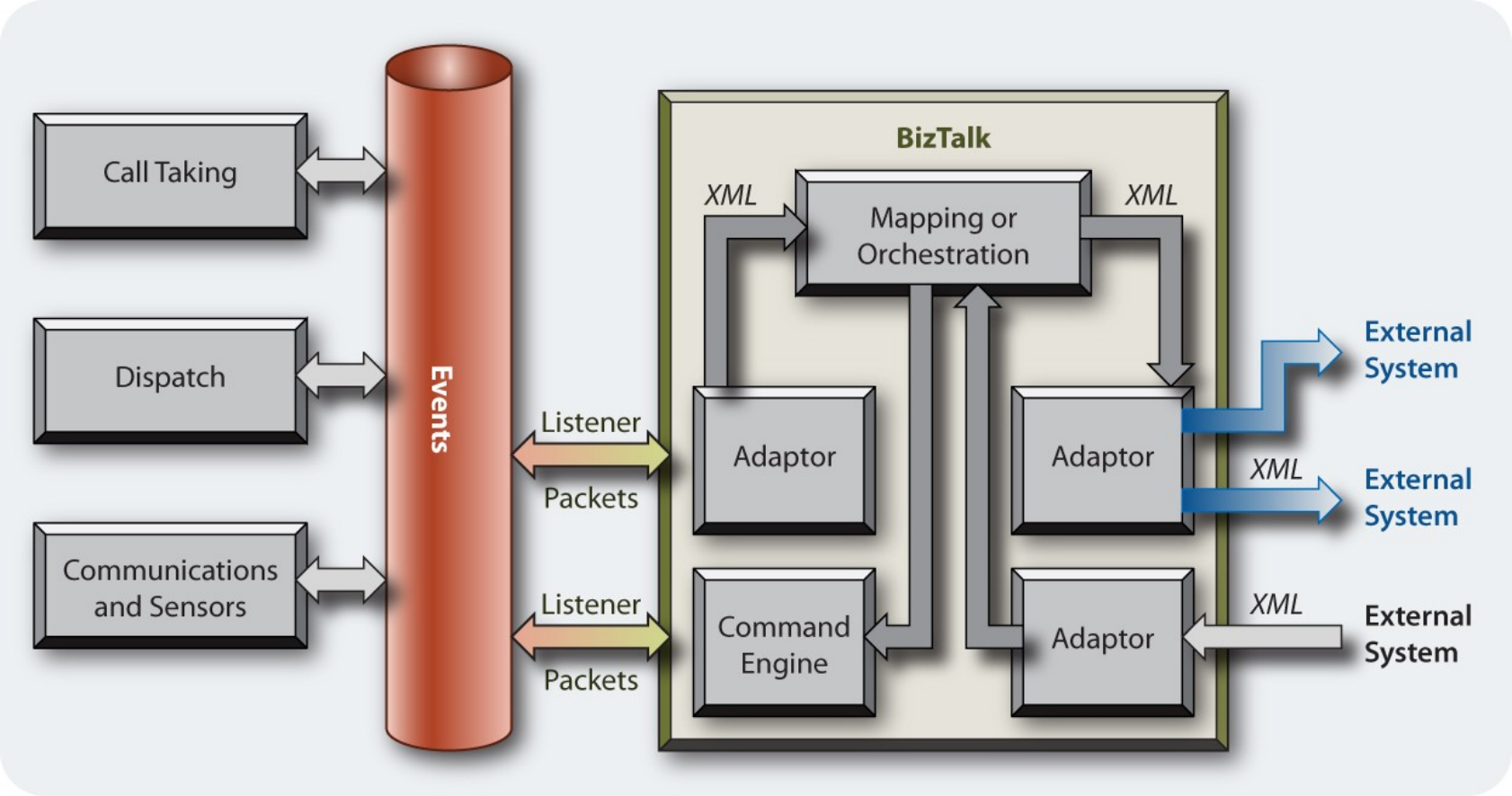
I/CAD: Intergraph was the first company to offer computer-aided dispatch (CAD) based on a fully integrated map and geographic database.

Mobile Data Terminal

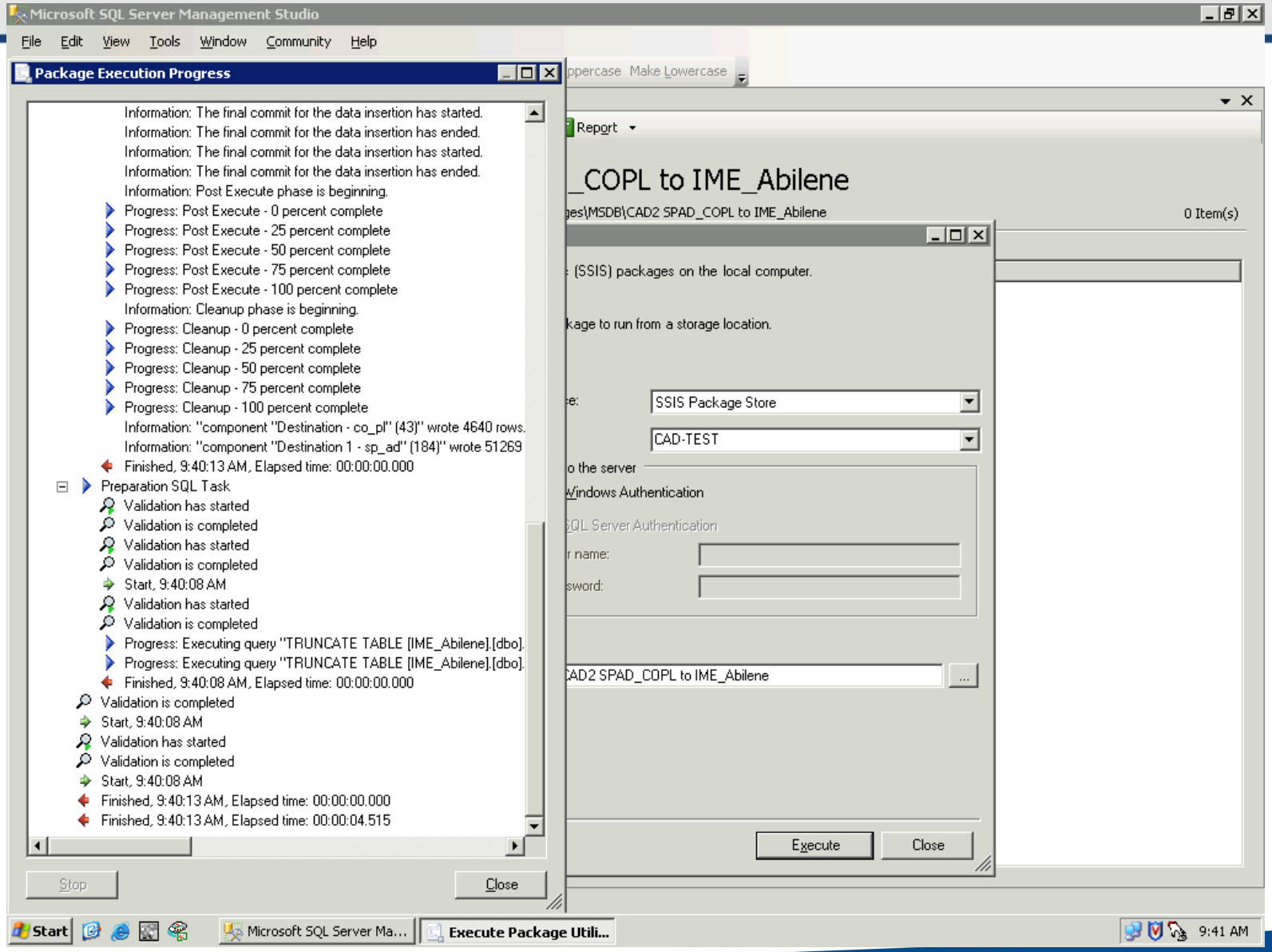



SQL Mirroring
I/CAD Replication
Server Farm 1
Server Farm Backup
Primary DB
Interface A
Interface B
Archive DB
Training DB
Web Server
Secondary DB
Interface A
Interface B
Archive DB
Training DB
Web Server
LAS LAN/WAN
User Updates
Main Control Room
Calltaker
ICCS
Dispatcher
"Backup" Control Room
Calltaker
ICCS
Dispatcher
I/Netviewer
Remote User
EOC
ICCS TETRA Gateway
FBC
ICCS TETRA Gateway
TETRA

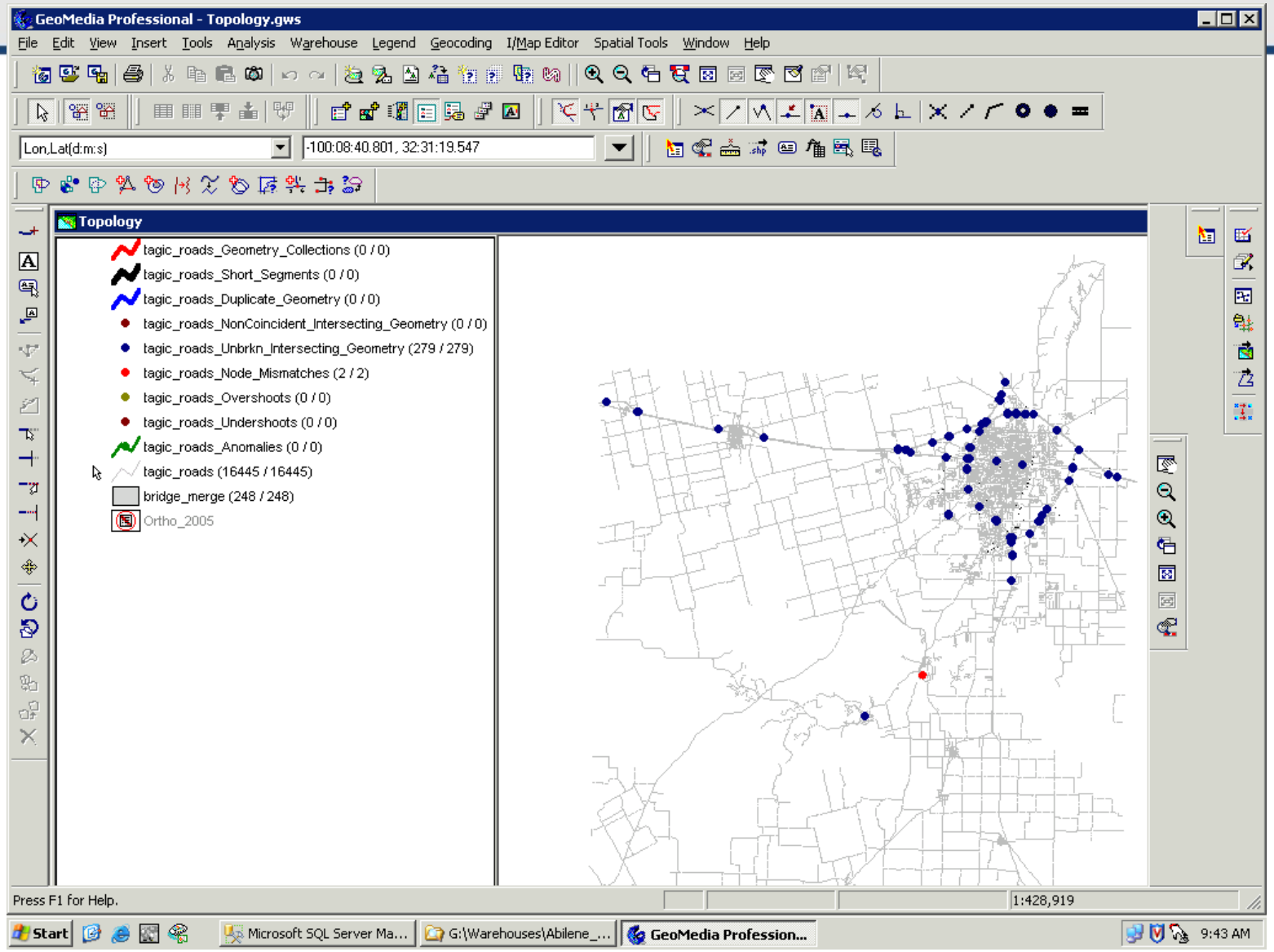
… web services!



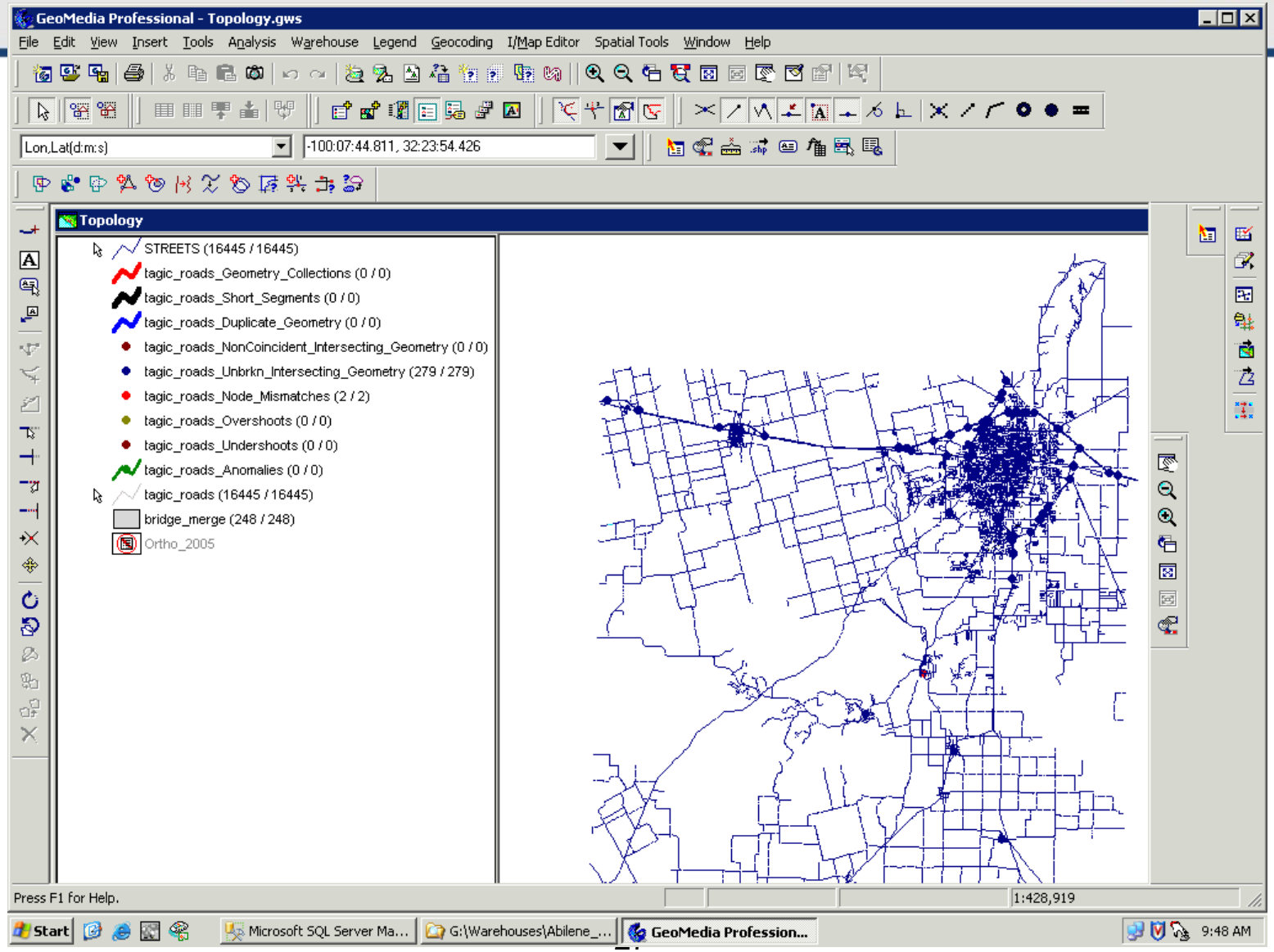
Address Geocoding in I/CAD: data set up in GeoMedia + I/Map Editor



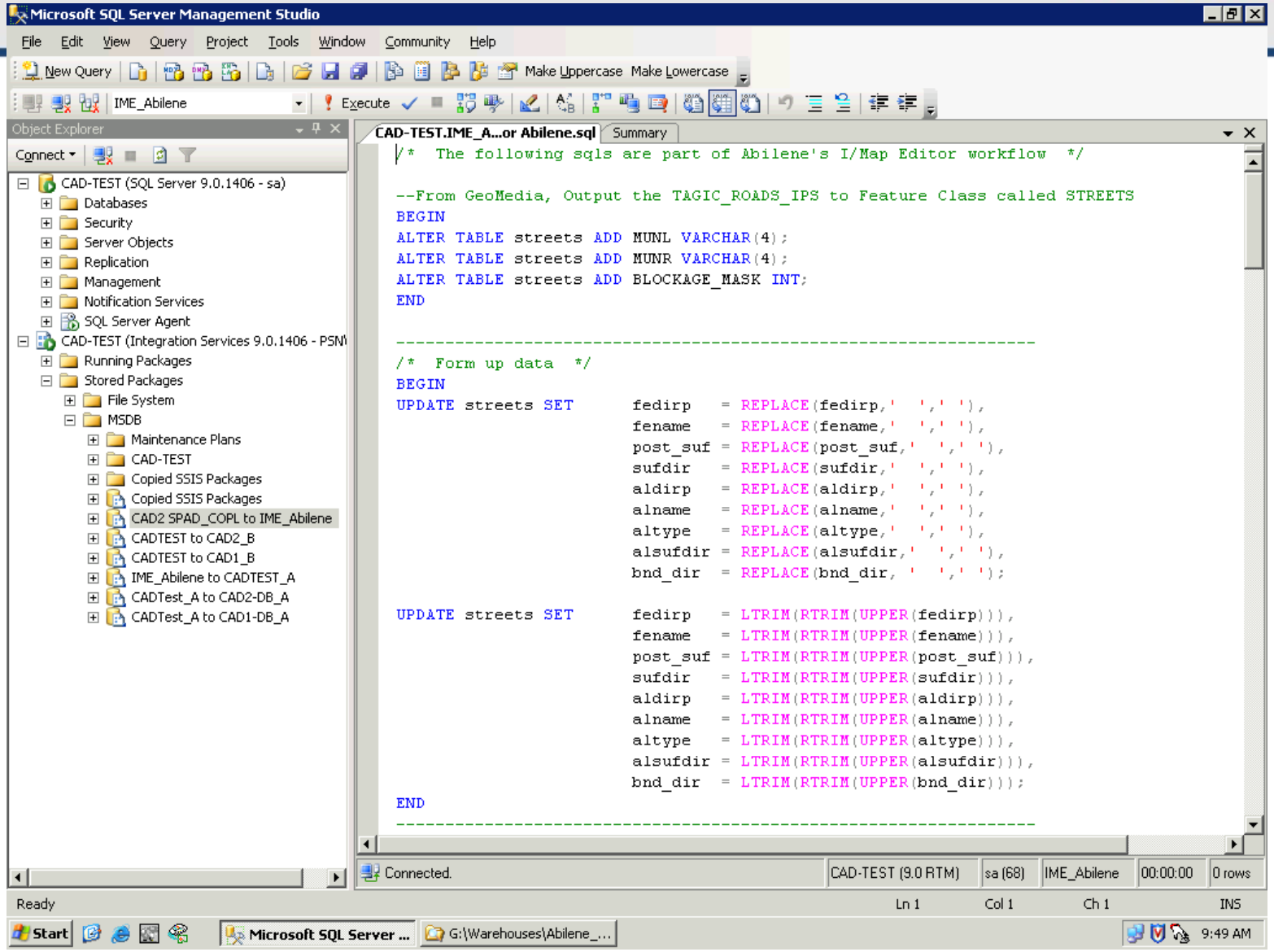
Check Topology



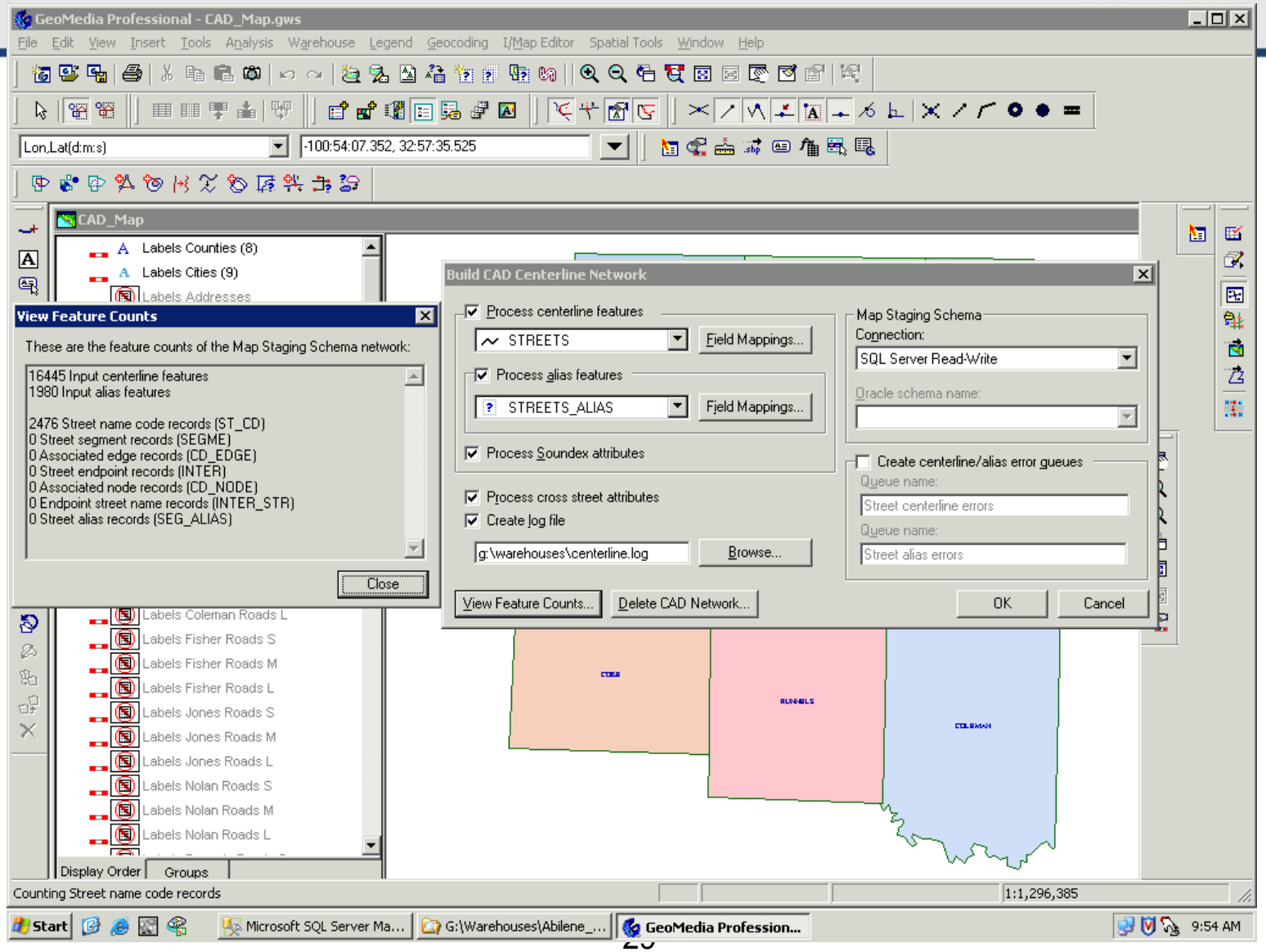
STREETS Created



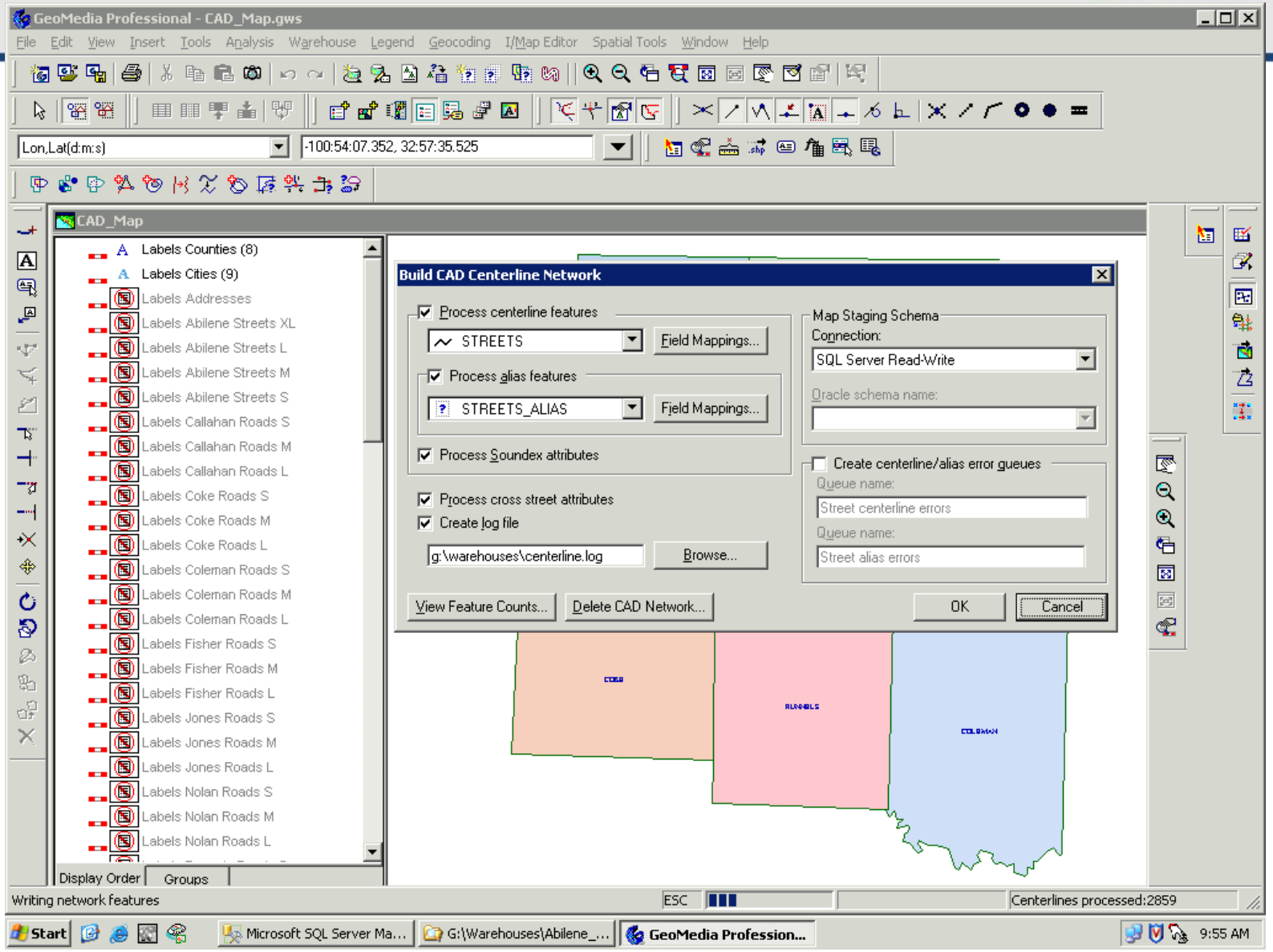
Pre-Process STREETS



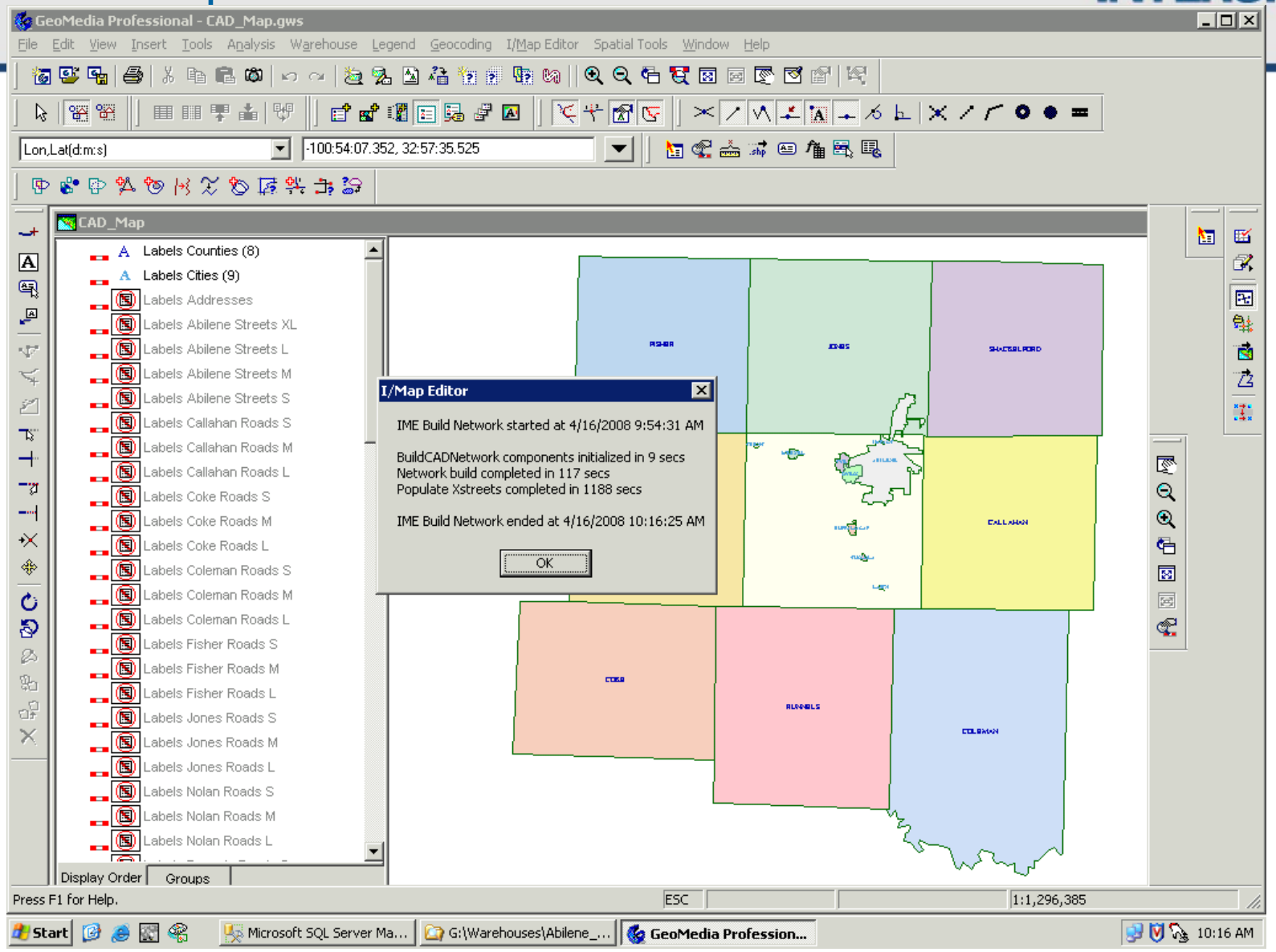
Build Centerline Network



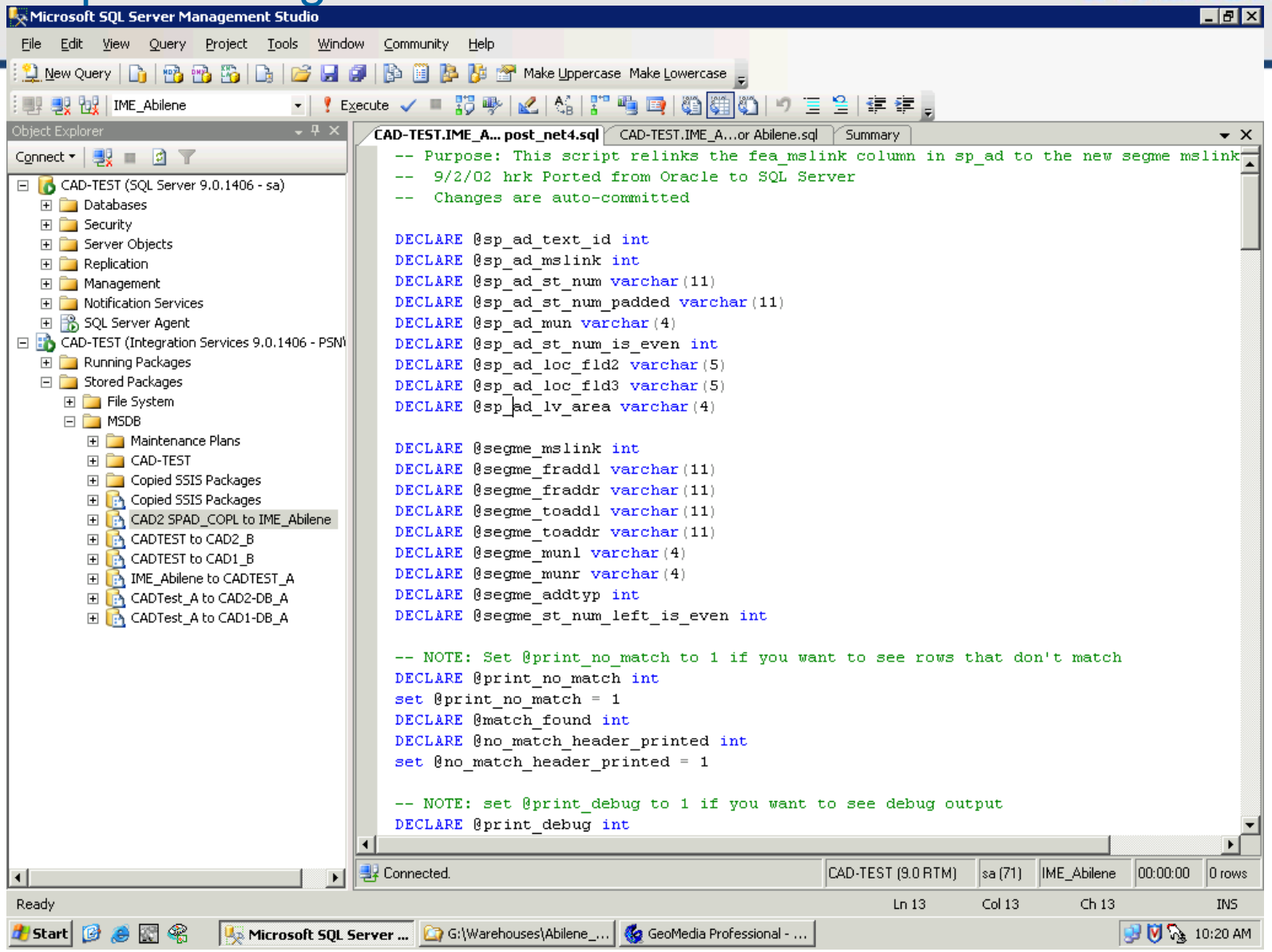
Running the Build



Build Complete



Post-processing



Emergency Operation Management

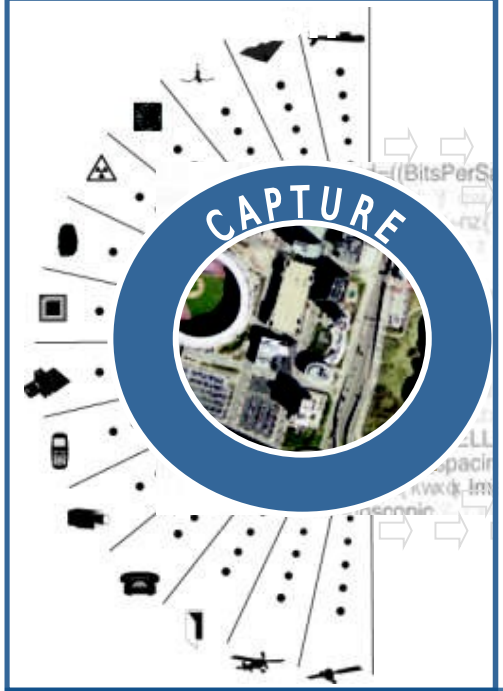
Emergency Operation Center

INTERGRAPH

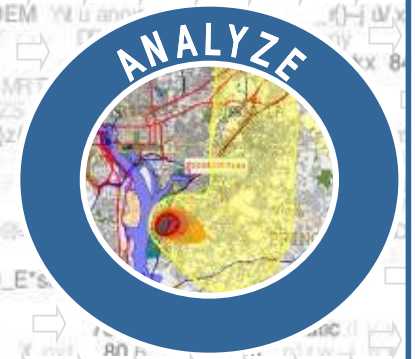
Emergency Operation Management

INTERGRAPH

Data Capture & Sensor



Combination of Geospatial & Emergency Response



Interagency Data Integration

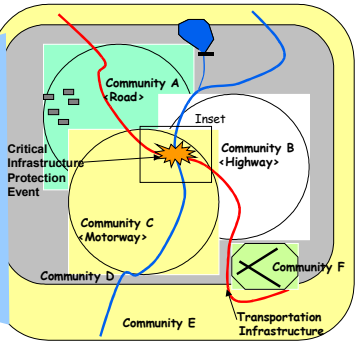
From Need to Know to- Need to Share to- Responsibility to Provide

Common Relevant Operational Picture

INTERGRAPH

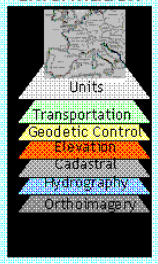
GIS Specialists | **NATO Commands** | **Functional Systems** | **Analysis & Support** | **Crisis Management**

Common Relevant (Interoperable) Operating Picture



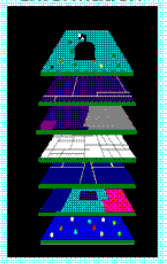
Global
National
NATO Strategic
NATO Regional

Reference Information



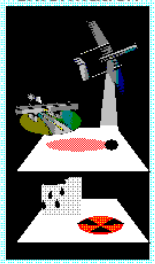
Information classes of digital geographic data defined in the collective as core geospatial, gazetteer, catalogue and viewer Services

Infrastructure Information



Information classes defined in domain and thematic areas of interest: Orbat Info, Janes Defence, Transportation, Air, Land

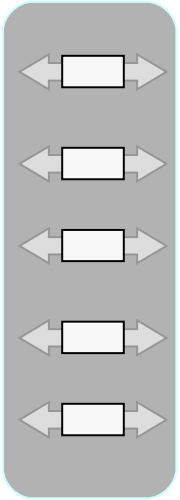
Dynamic Information



Information classes of dynamic environmental and decision support: Enemy, Friendly and Neutral Forces; Weather; Traffic Movements, Sensors, Location Services

Product Information

Product classes generated by distributed systems: Map Views; Land/ Air/ Sea Pictures; Intelligence or Logistics Status Reports



National Sources: Data and Services

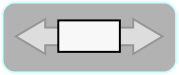
NATO HQ: Data and Services

Functional Services: Data and Services

In-theatre: Data and Services

Location Based Services

Information Architecture: Models, Transforms, Application Schemas and Dictionaries



Service Architecture: Standards, Certified Services for Accessing, Processing, Presenting Information

Enabling a Geospatial Interoperability Framework

INTERGRAPH

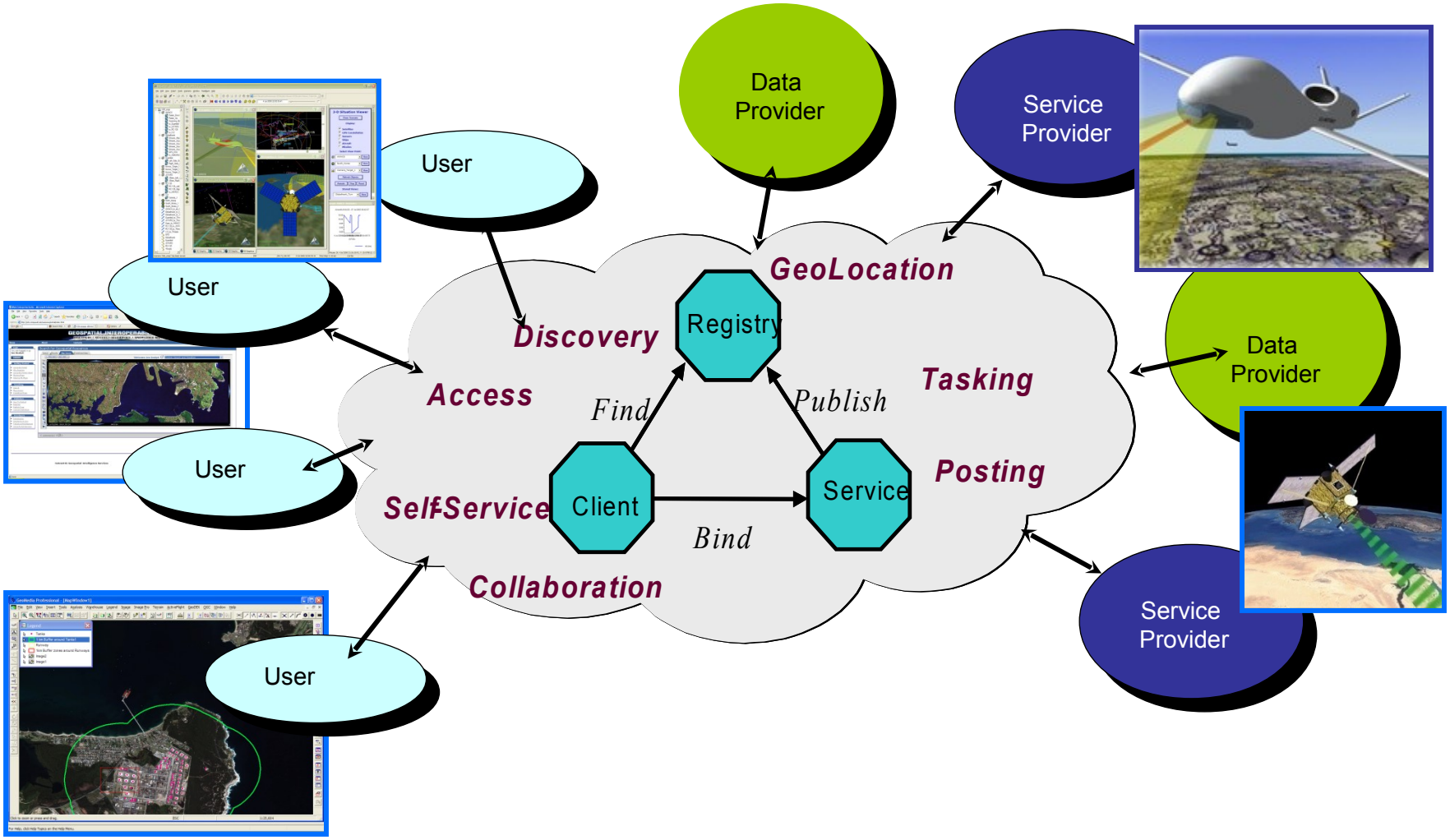
Geospatial Intelligence Standards

Enabling a Common Vision

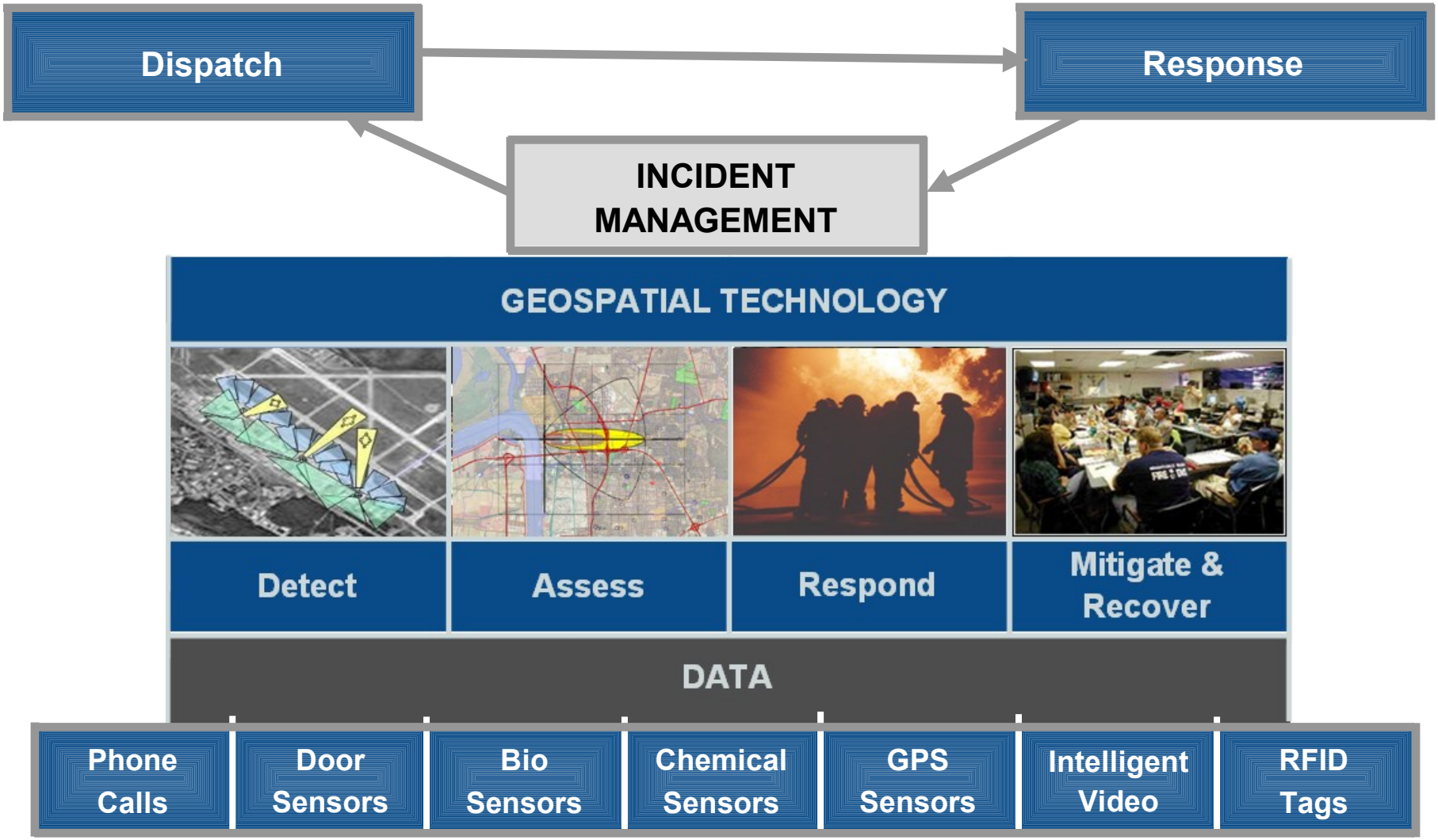
November 2006

NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

CROP SOA-based



Emergency Operation Management

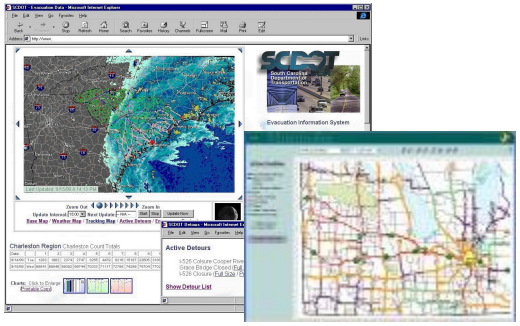


Emergency Operation Center

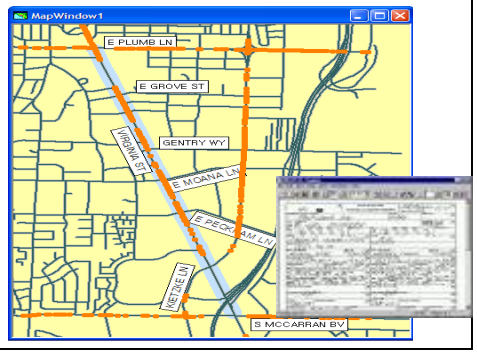
INTERGRAPH

Events Management

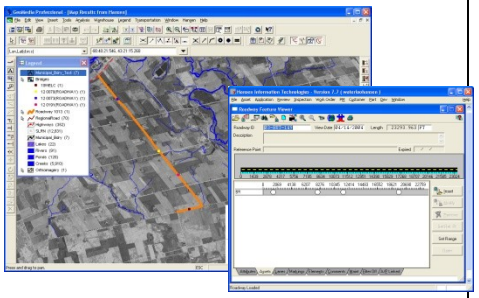
COP - Web Data Sharing



DSS



Mobile Resource Mgt



Intergration of Data and Models

SDI Data Sources

Sensors, RFID, AVLs Data Sources

INTERGRAPH

PRESS RELEASE

FOR IMMEDIATE RELEASE

FOR FURTHER INFORMATION:
Renee Wagner
Manager, Corporate Communications
+1.404.751.2554
Renee.Wagner@Intergraph.com

Intergraph® Security Incident Management Solutions Successfully Protect Delegates, Guests and Infrastructure at 35th G8 Summit

Team led by SELEX Sistemi Integrati, a Finmeccanica company, delivered integrated security system to provide common operating picture to ensure situational awareness

HUNTSVILLE, Ala., Sept. 21, 2009 – Intergraph®, as part of a team led by SELEX Sistemi Integrati (SSI), the systems integrator for the Finmeccanica Group, played a vital role in successfully ensuring the safety and security of world leaders, guests and infrastructure at the G8 Summit, held in L'Aquila, Abruzzo, Italy, from July 8–10, 2009.

Intergraph's integrated security solutions provided a common operating picture that aided Civil Protection Department personnel in their efforts to secure vulnerable areas, detect and assess threats and quickly respond to incidents. The integrated security system also enabled the exchange of intelligence between the Central Management Station and several remote command and control centers.

During the Emergency Phase of L'Aquila earthquake, the Presidence of Italian Government assigned to the Italian National Civil Protection Department (INCPD) the organization and management of the 2009 G8 Summit (July 8-10).

There was a huge problem to solve: inside the organizational flows structured to manage the earthquake emergency using Augustus method, the INCPD had to operate in the G8 context using the Great Event method, assuring hight level of security and minimizing the impacts of the Event on the earthquake emergency organization.

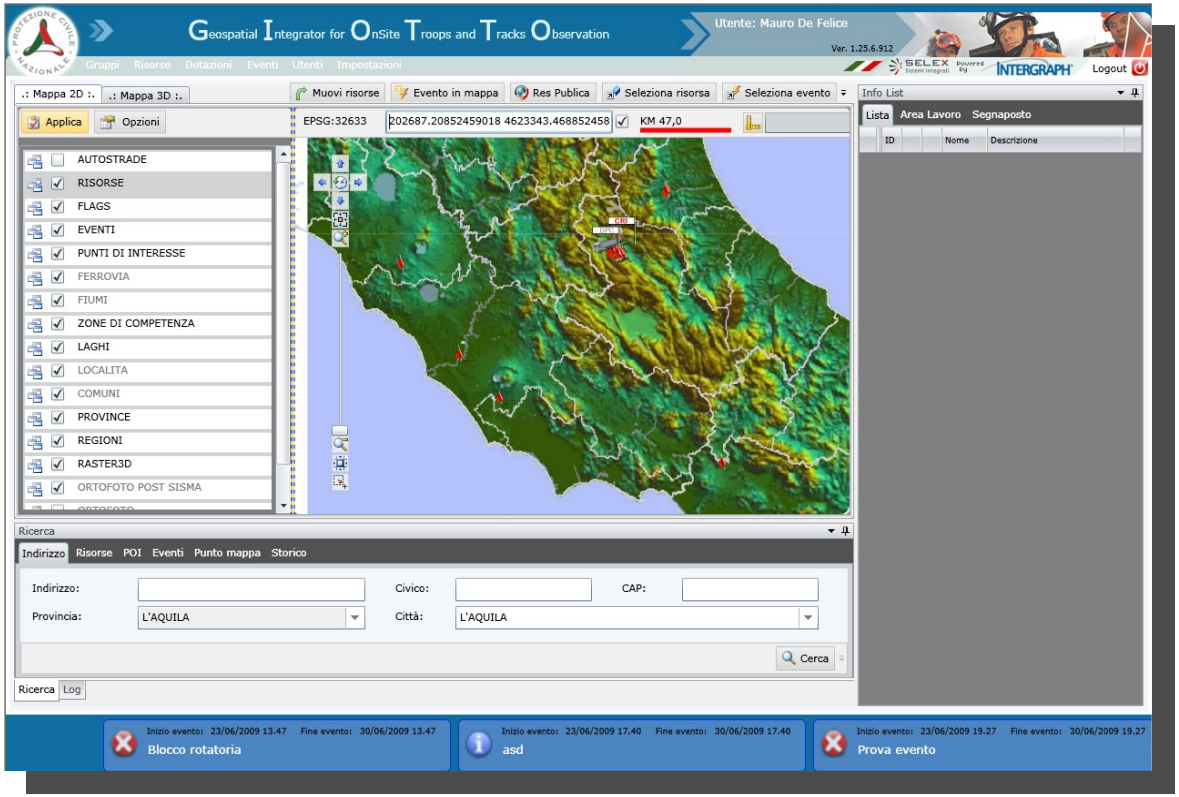
Some numbers:
42 National delegations;
21 Chiefs of State;
3.500 staff people;
15.000 Police people;
.....

The INCPD asked the Italian industry to provide the most advanced technologies and competences to guarantee the management of the event. In this framework Finmeccanica Group will play a key role with its companies operating in the Public Safety and Security sectors, by offering state-of-the-art products.

SELEX Sistemi Integrati, a Finmeccanica Group company, was prime contractor in the design and implementation of a new integrated system that will enable the INCPD to safeguard the meeting.
Through various structures, directed from a Central Coordination and Management Office, it has been possible to collect, analyze and coordinate all the data sent from the locations of the various resources deployed (Interior Ministry, Carabinieri, Army, etc.) and from sensors installed for security purposes.
The G8 Decision-Making Room, equipped with sophisticated software capable of integrating all data coming from troops, vehicles, security sensors and so on, had its “heart” in the Common Operational Picture has been developed by Selex Sistemi Integrati with Intergraph Italy technologies and support, and called **"Geospatial Integrator for Onsite Troops and Tracks Observation”**.
Linked with the Earthquake Emergency Situational Control Room (DICOMAC), this system has enabled the Chief of G8 Operations to have real time control of the whole complex scenario.

Geospatial Integrator for Onsite Troops & Tracks Observation

The application **Geospatial Integrator for Onsite Troops and Tracks Observation** is integrated with the planning, monitoring & control system realized by Selex Sistemi Integrati and Intergraph Italy in order to give to the Decision Makers a full Common Related Operating Picture during Great Events and Emergencies. The CROP shows to the operators of all the corps involved: 2D & 3D interfaces; advanced queries, annotations and data/news sharing functionalities.



The main components of the application are:

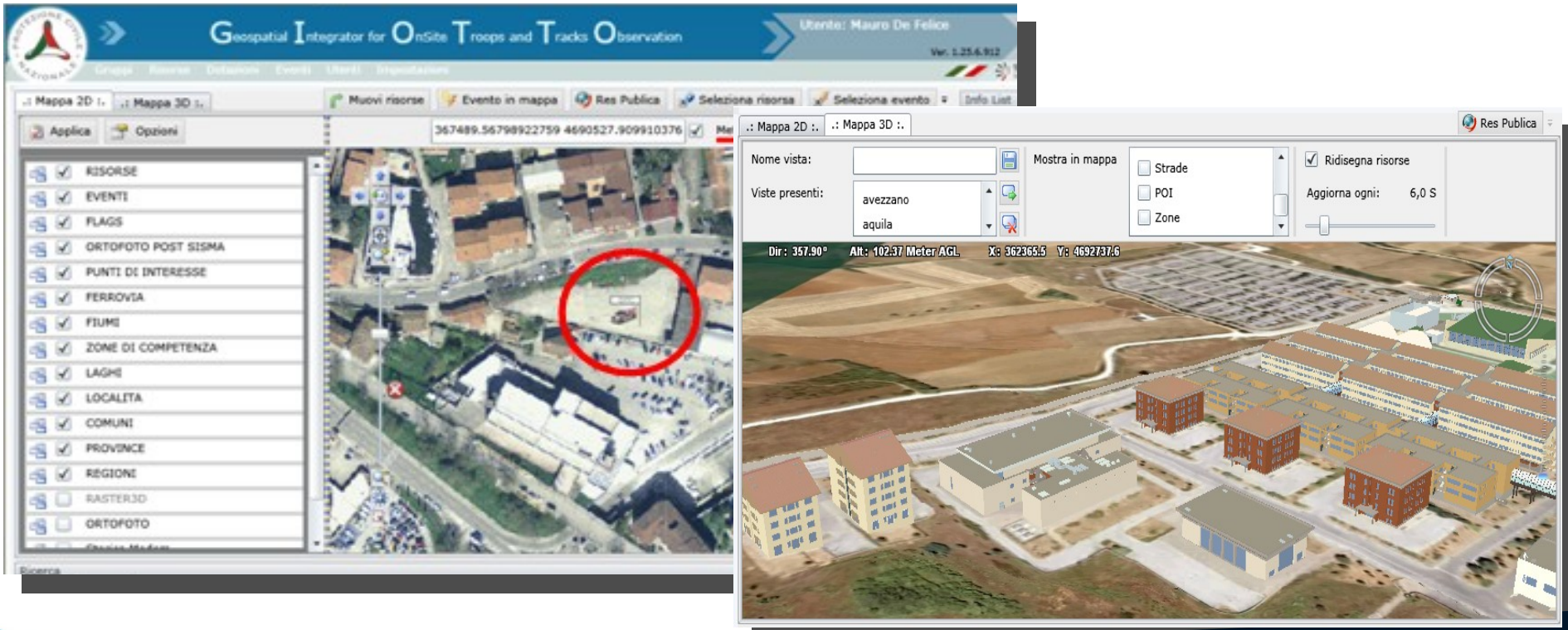
- The Cartography:
  - basic (2D/3D)
  - detailed (POI – Point of Interest)
- A Resource Management functionality that can manage even groups;
- An Events Management functionality, to monitor all the "news" coming from field to better undertand, in real time, the whole scenario.

Geospatial Integrator for Onsite Troops & Tracks Observation

It's the "commercial" cartography (or the cartography available in the databases of all the Public Administrations).

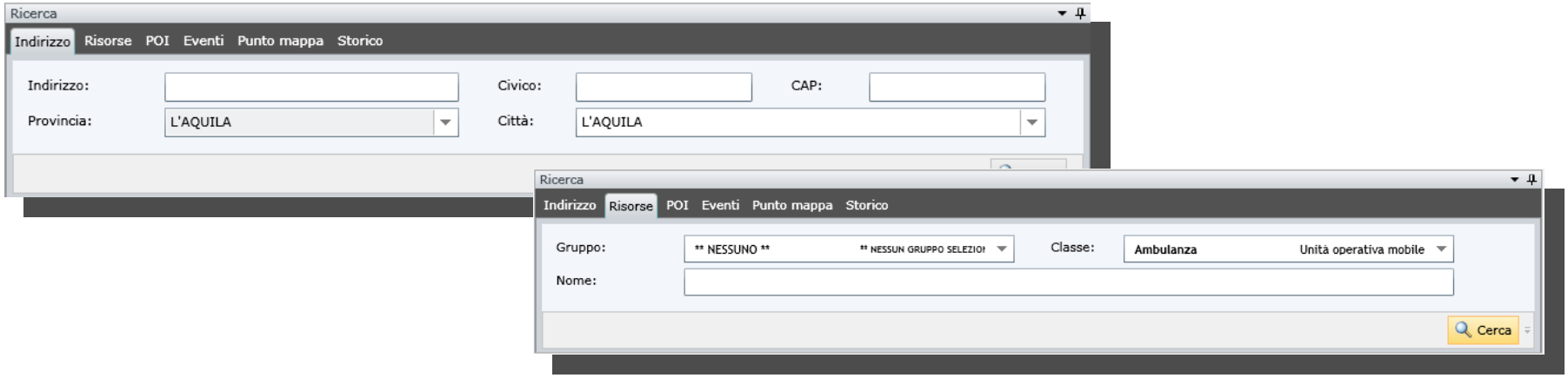
It's possible to manage it both in vectorial layers (e.g. Navteq and/or TeleAtlas data) and in raster layers (e.g. the ortophoto).

The basic cartography is composed by Digital Terrain Model (DTM) layers too, essential to navigate the territory and the other elements displayed in the 3D maps and views.

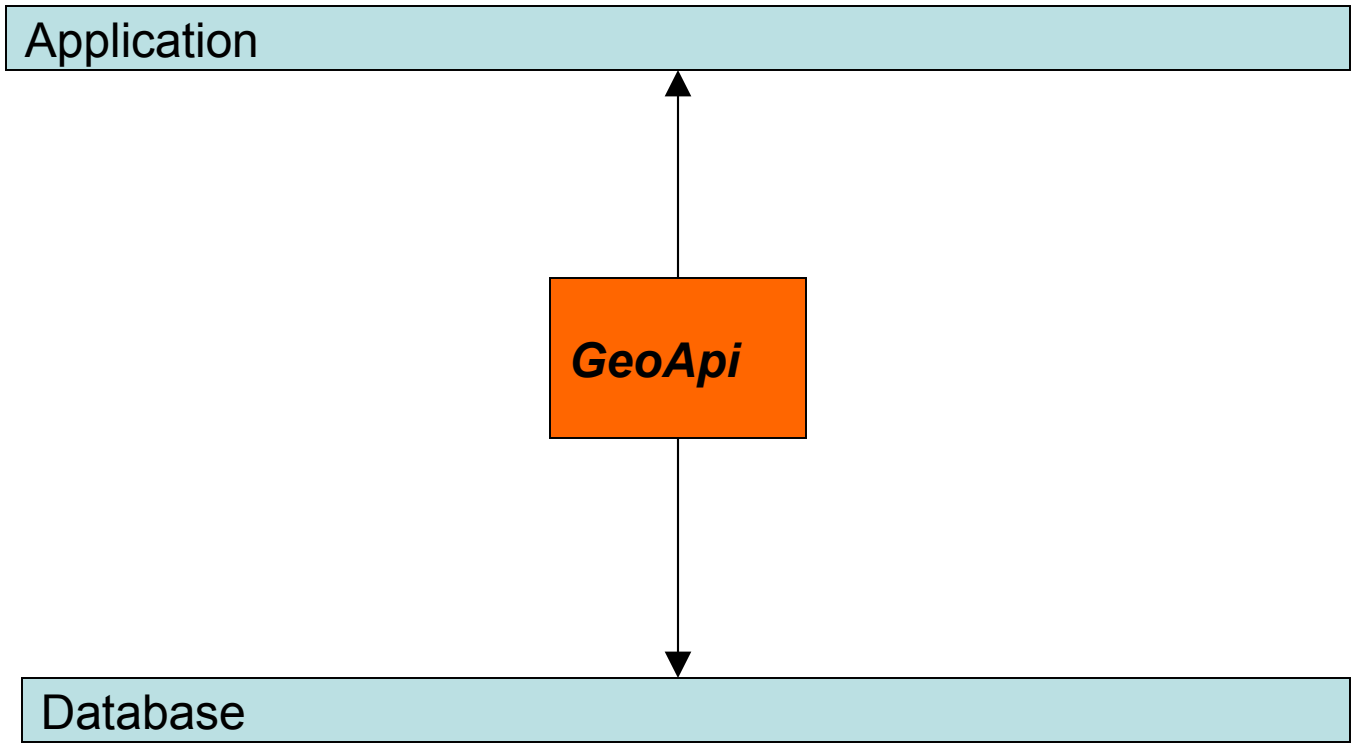


The Addresses are in Main Features!

- Maps navigation: zoom in, zoom out, pan, window, ...
- Research and localization:
  - Addresses: the application has an advanced normalization & geocoding engine to help operators to easily find the areas of interest (town, town + address, postage code (CAP/ZIP), and so on....
  - Resources: it is possible to search and to show any resource involved in the organization (using the links with other systems (e.g.: “access control systems” , etc.)
  - Groups: it’s possible to search all groups that were input in the database and to visualize all the resources of the group

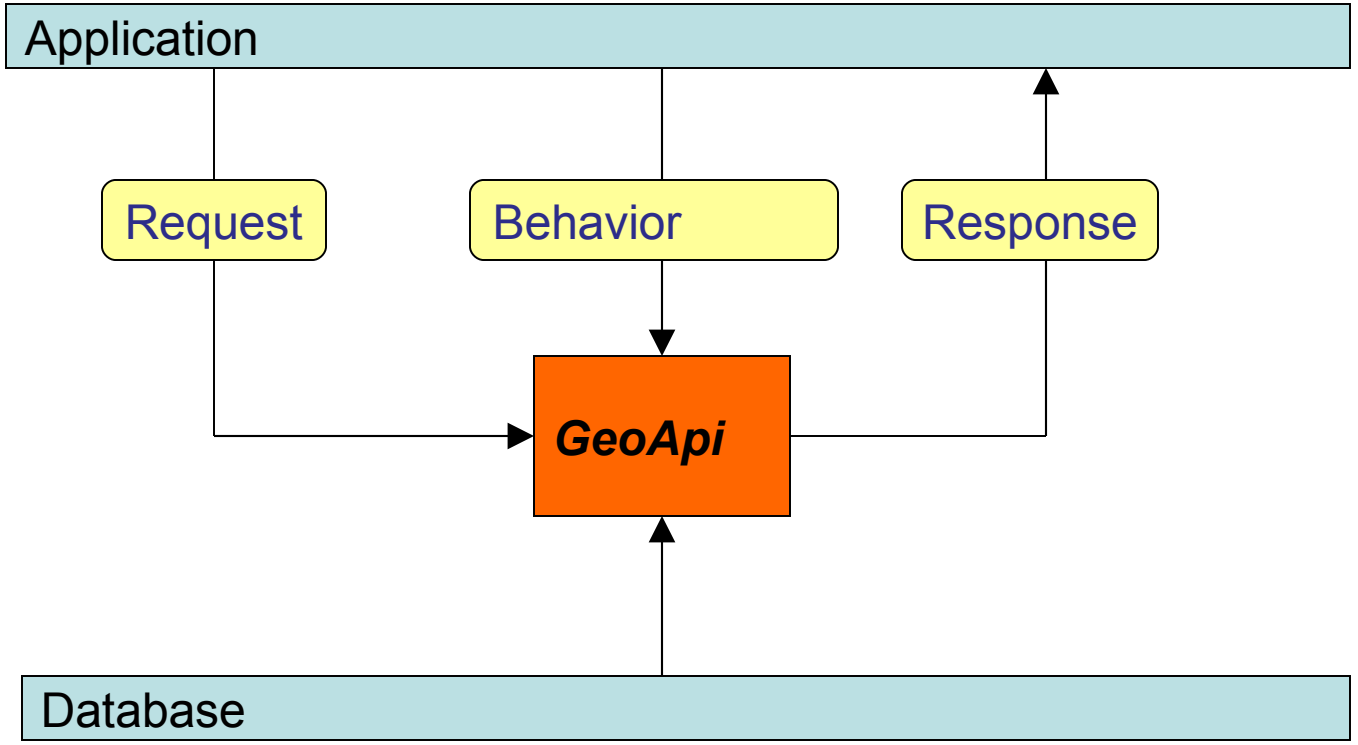


GeoApi



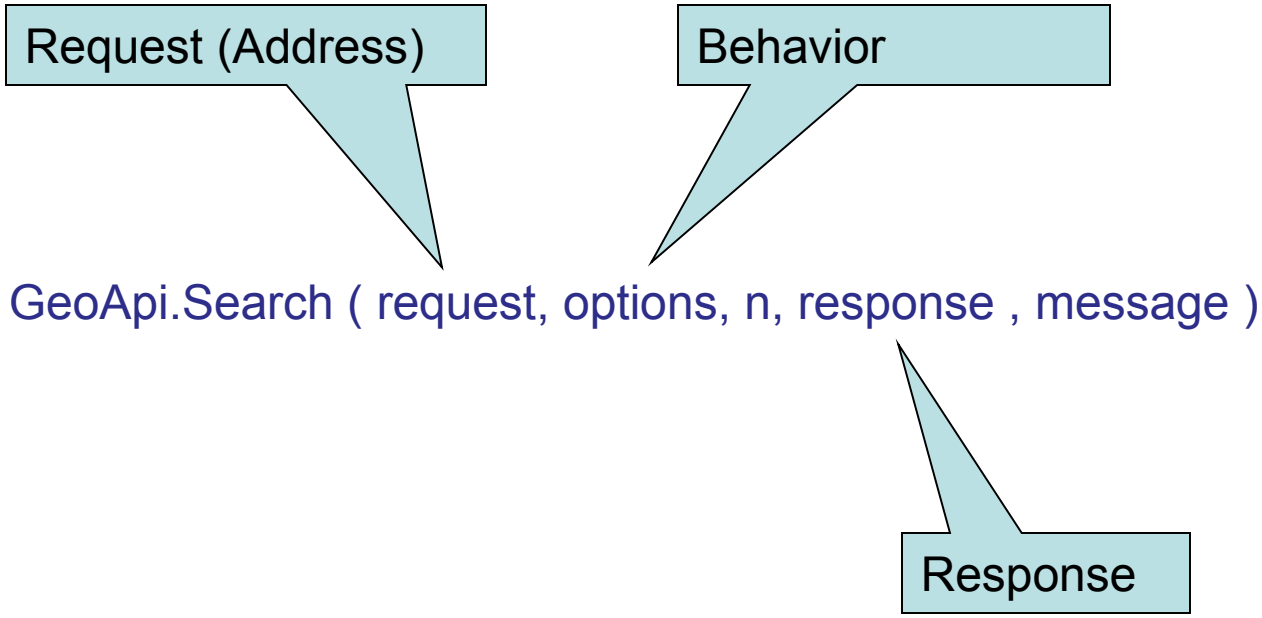
GeoApi

Comunication

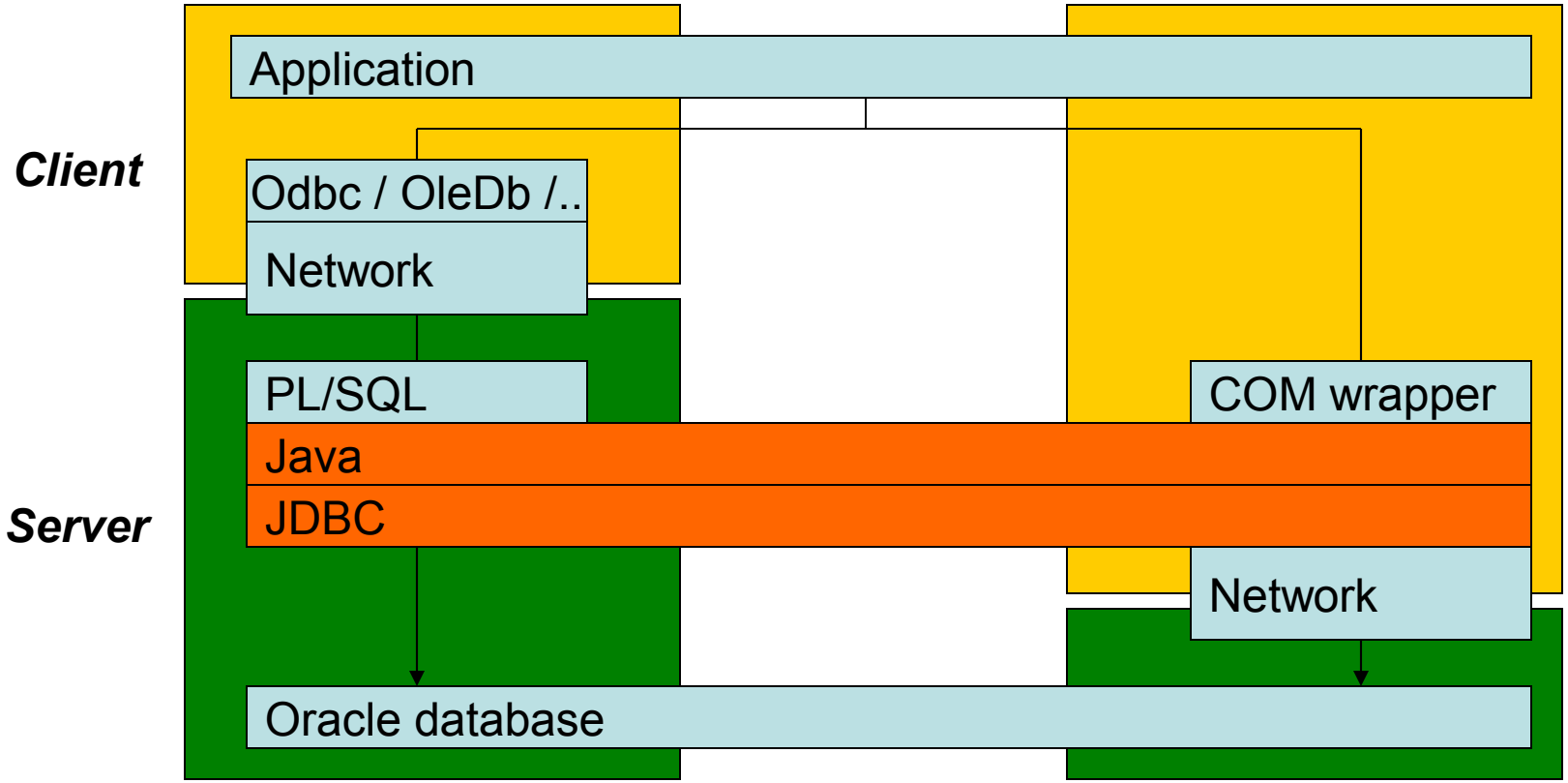


GeoApi

Comunication: search for an address

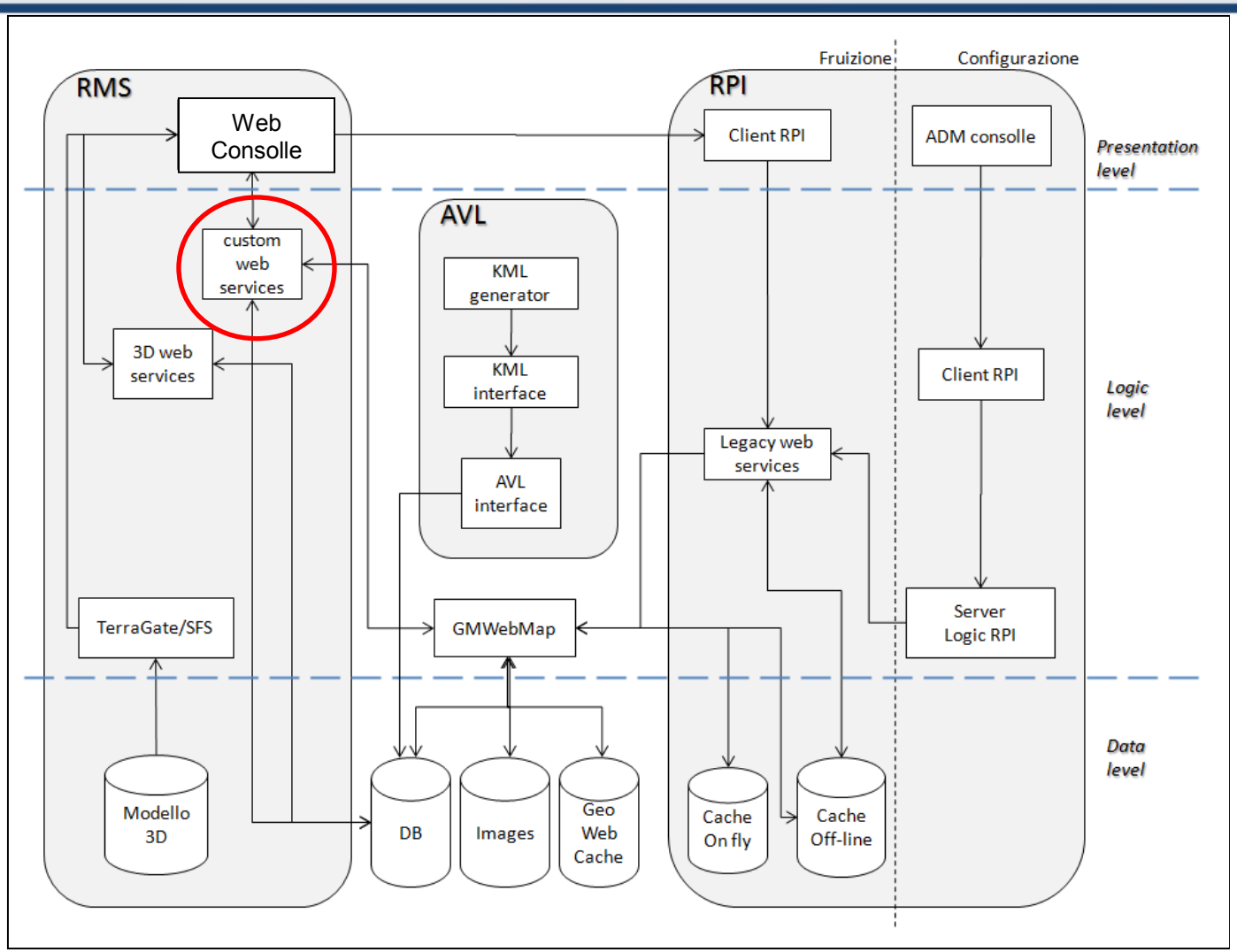


GeoApi (Rel. 1.0)



Rel. 2.0 is a web service!

GeoApi Rel. 2.0 is a web service!



Geospatial Integrator for Onsite Troops & Tracks Observation

Thanks for the interest!

Grazie per l'attenzione!

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