



E9-1-1 and NG9-1-1 Technology Update and GIS Information Session



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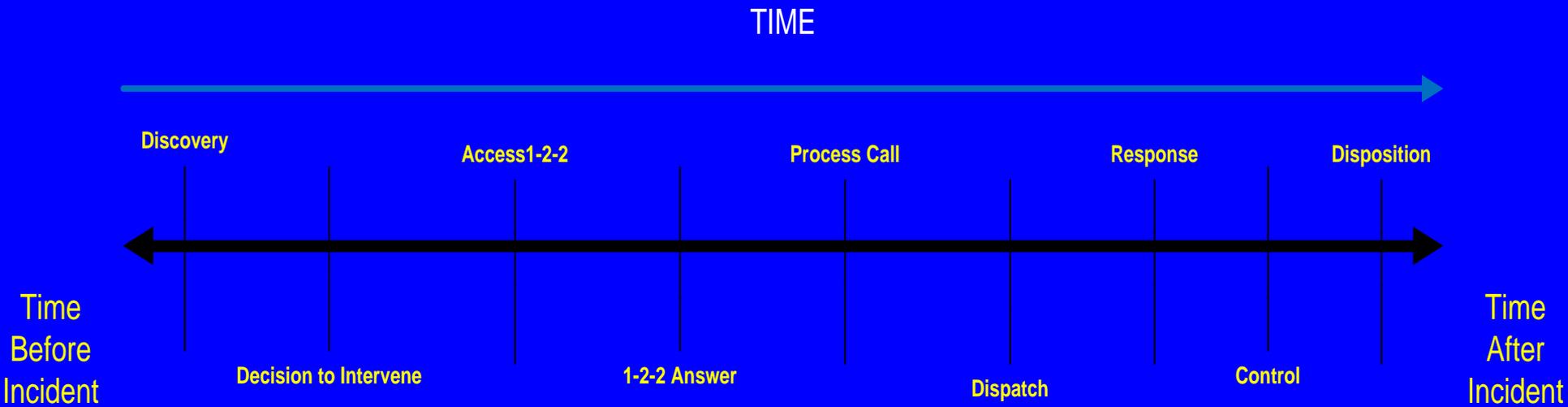
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AGENDA

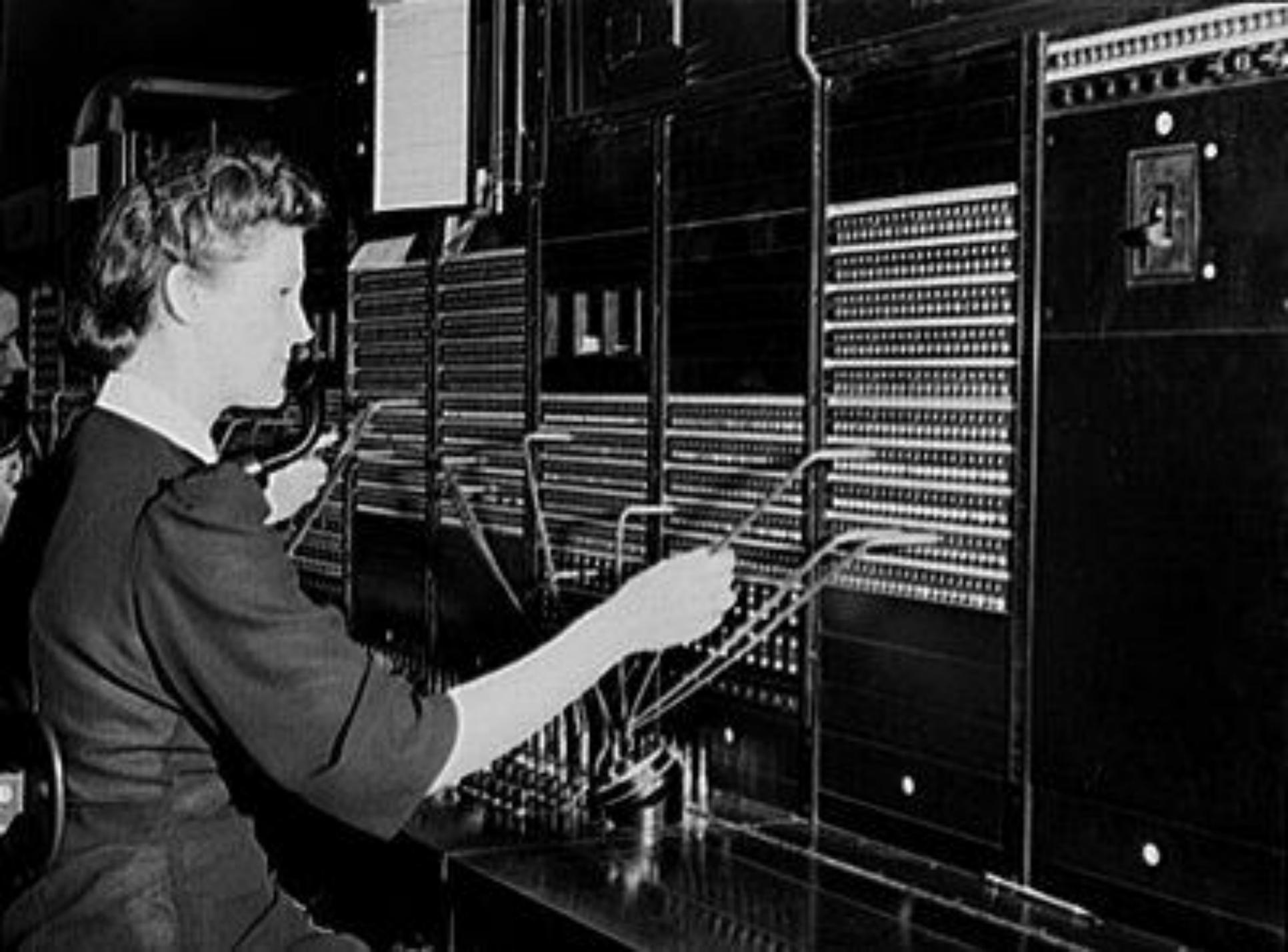
- Why 9-1-1
- 9-1-1 Technologies
- GIS
- What's Coming

Why 9-1-1?

WHEN SECONDS COUNT











Proper Planning



9-1-1 Technologies

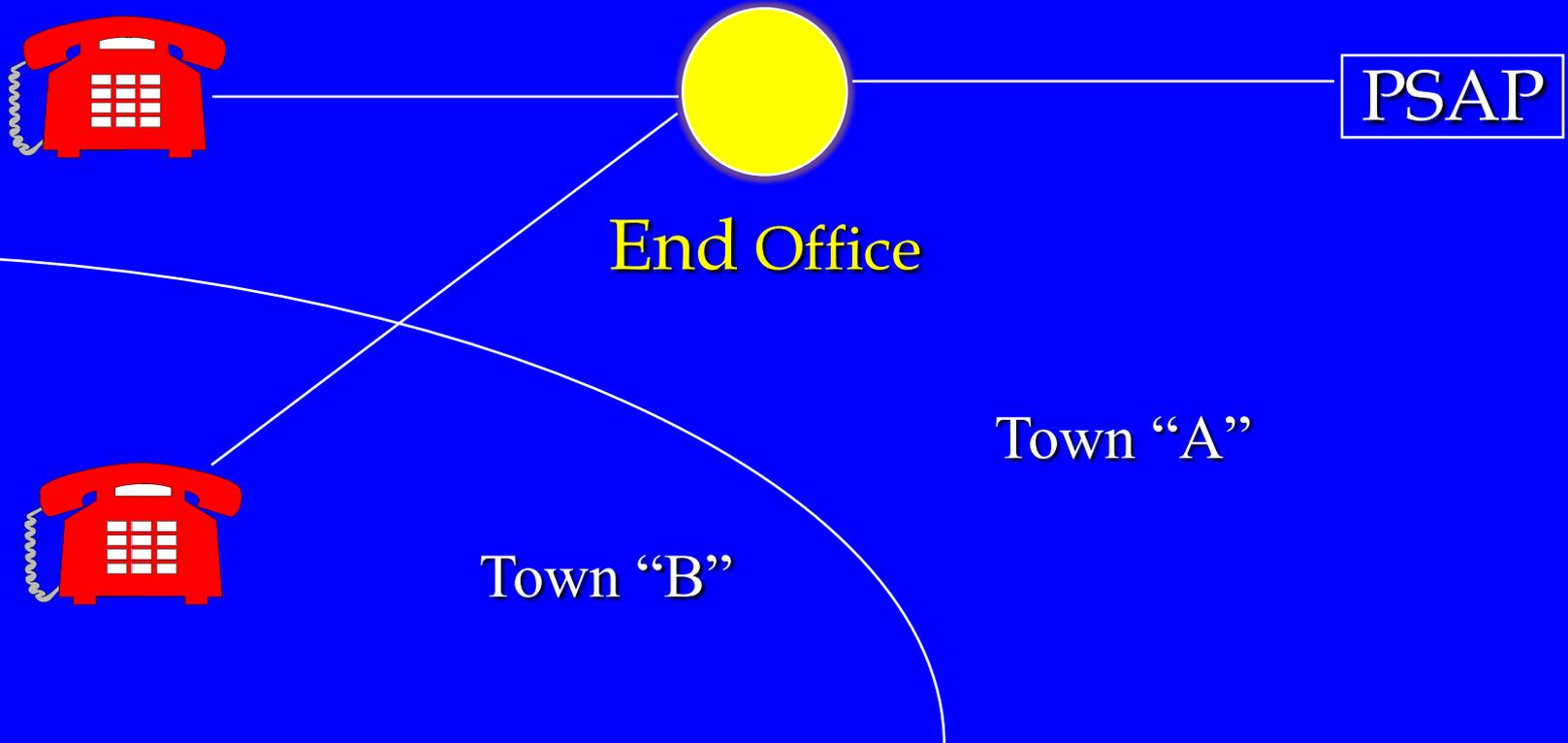
An Unlikely Lottery Winner

**“Everything that
can be invented has
been invented”**

**Charles H. Duell, US Patent Office
1899**

In the beginning...

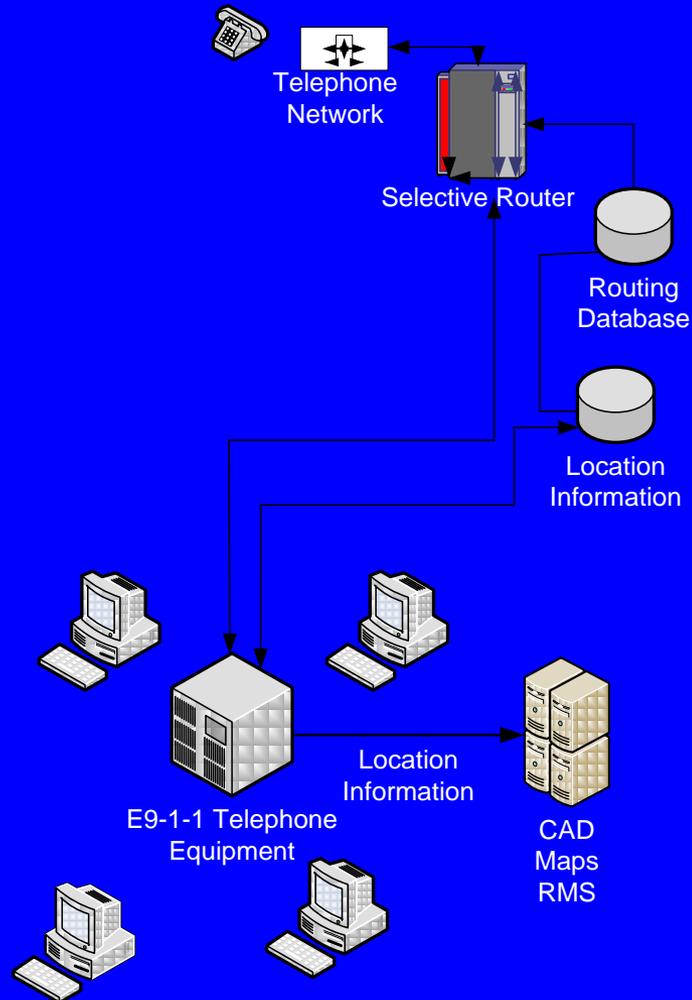
Basic 9-1-1



E9-1-1 Data Terms

- ANI - Automatic Number Identification
- ALI - Automatic Location Identification
- DB - Database
- DBMS - Data Base Management System
- ESN - Emergency Service Number
- ESZ - Emergency Service Zone
- MSAG - Master Street Address Guide
- PSAP - Public Safety Answering Point
- SP - Service Provider
- SR - Selective Router/Routing
- SRDB - Selective Routing Database

“Enhanced” 9-1-1

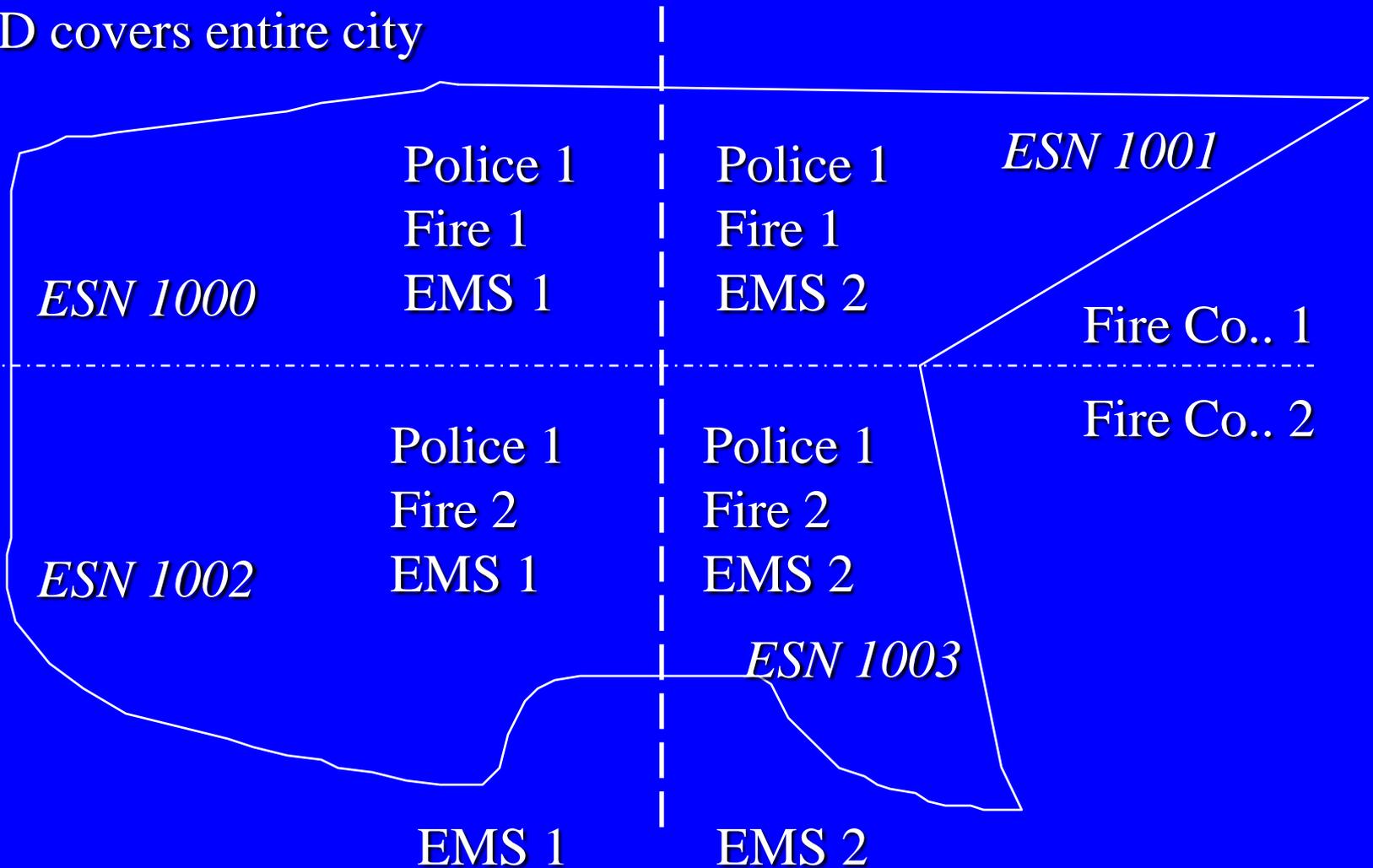


Central Office Example



Creating an MSAG

City PD covers entire city



MSAG Example

Dir.	Street Name	St Suffix	Low Range	High Range	O/E	Community	ESN
N	Adams	St	1	999		Anytown	1000
S	Adams	St	1	799		Anytown	1002
	Baker	Ave	500	1599	E	Bakersville	1003
	Baker	Ave	501	1598	O	Bakersville	1003
E	Main	St	1	1999		Anytown	1001
W	Main	St	1	2299		Anytown	1000
W	Main	St	2300	3799		Bakersville	1000

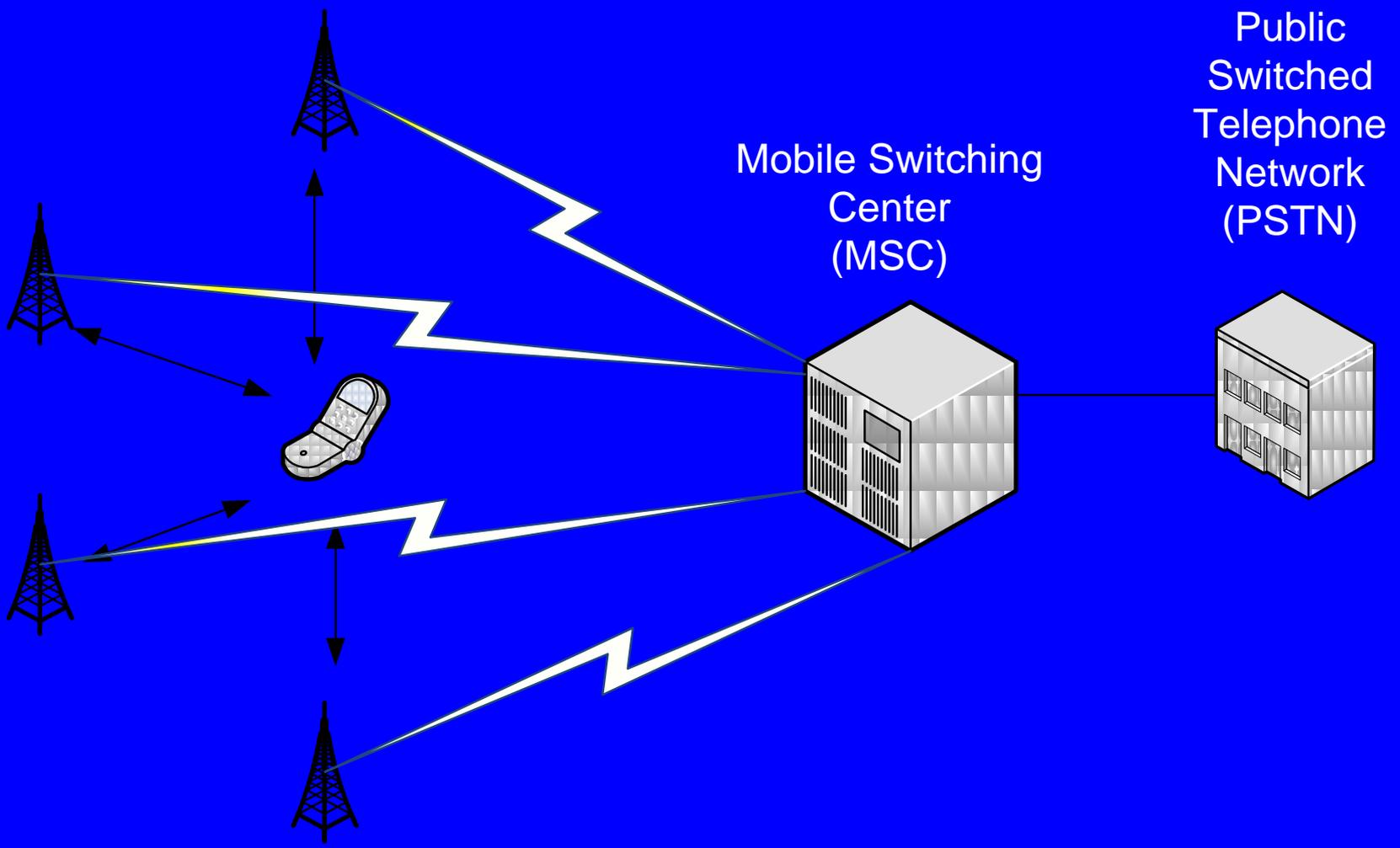
Wireless 9-1-1 Attributes

- RF Technologies
- Subscriber Based
- Location “Challenged”
- Lat/Long w/Error
- Multiple Location Standards
 - CDMA
 - TDMA

WIRELESS SERVICE PHASES

- Phase 0 = Call Delivery by Tower
- Phase 1 = Call Delivery w/Tower ID
- Phase 2 = Call Delivery
w/Longitude/Latitude

WIRELESS



Accuracy

Handset solutions:

50m for 67% of calls and 150m for 95% of calls.

Network solutions:

100m for 67% of calls and 300m for 95% of calls.

Meters to Feet

- 50 Meters = 164.0419 Feet
- 100 Meters = 328.0839 Feet
- Football Field = 300 Feet



Map Legend

 Cingular Sites

Cell Site Sectors

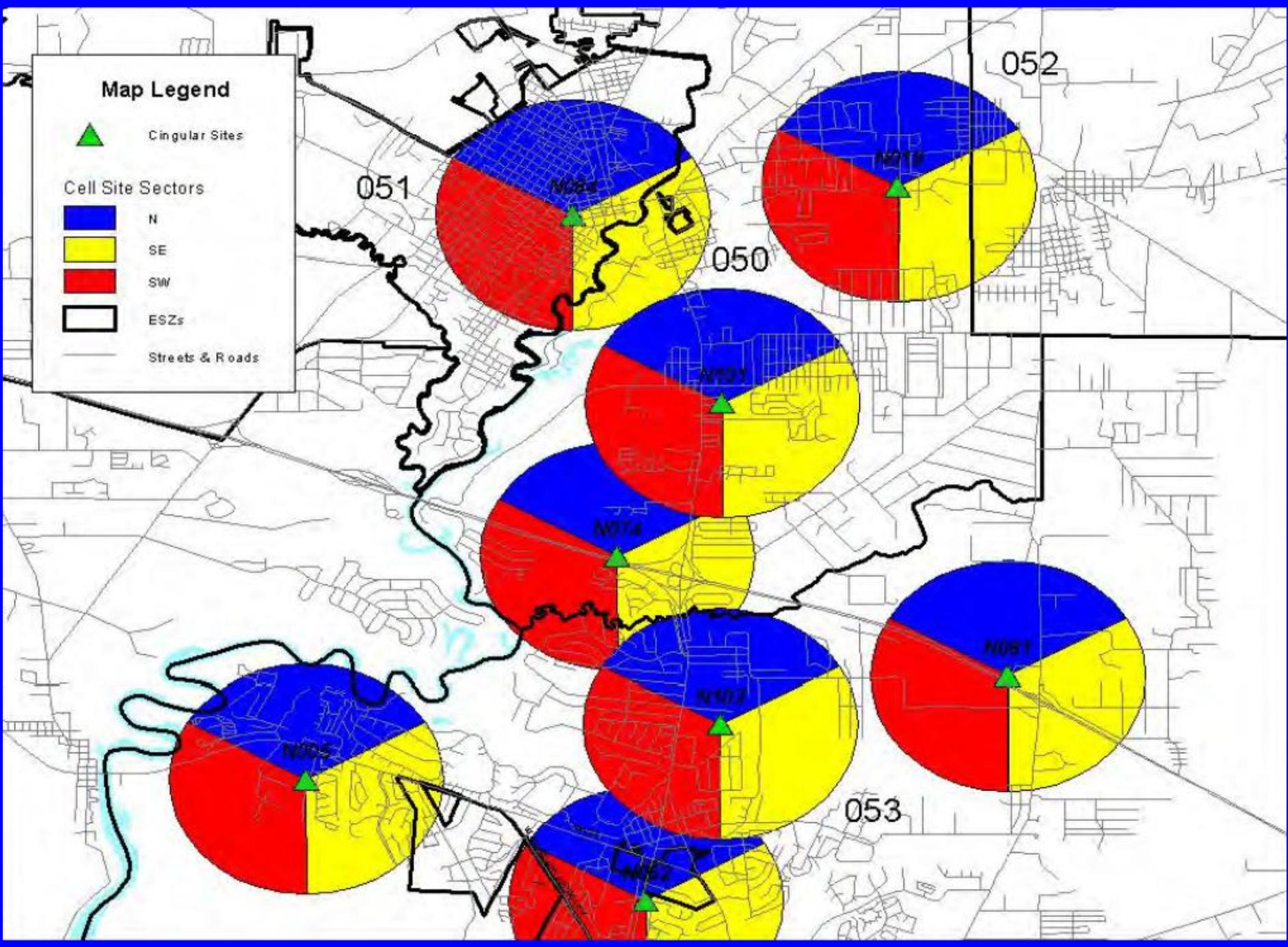
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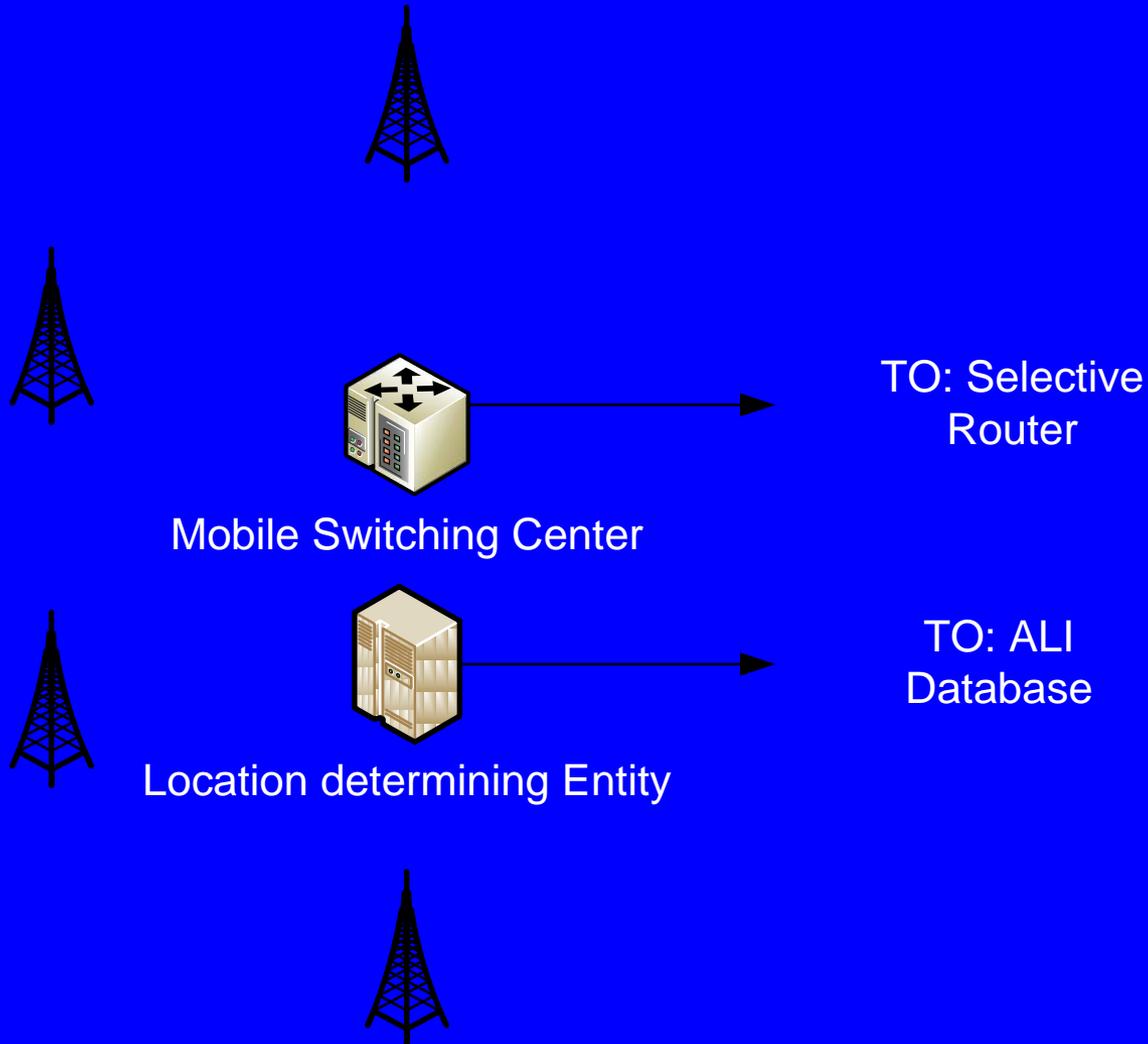
 SW

 ESZs

 Streets & Roads

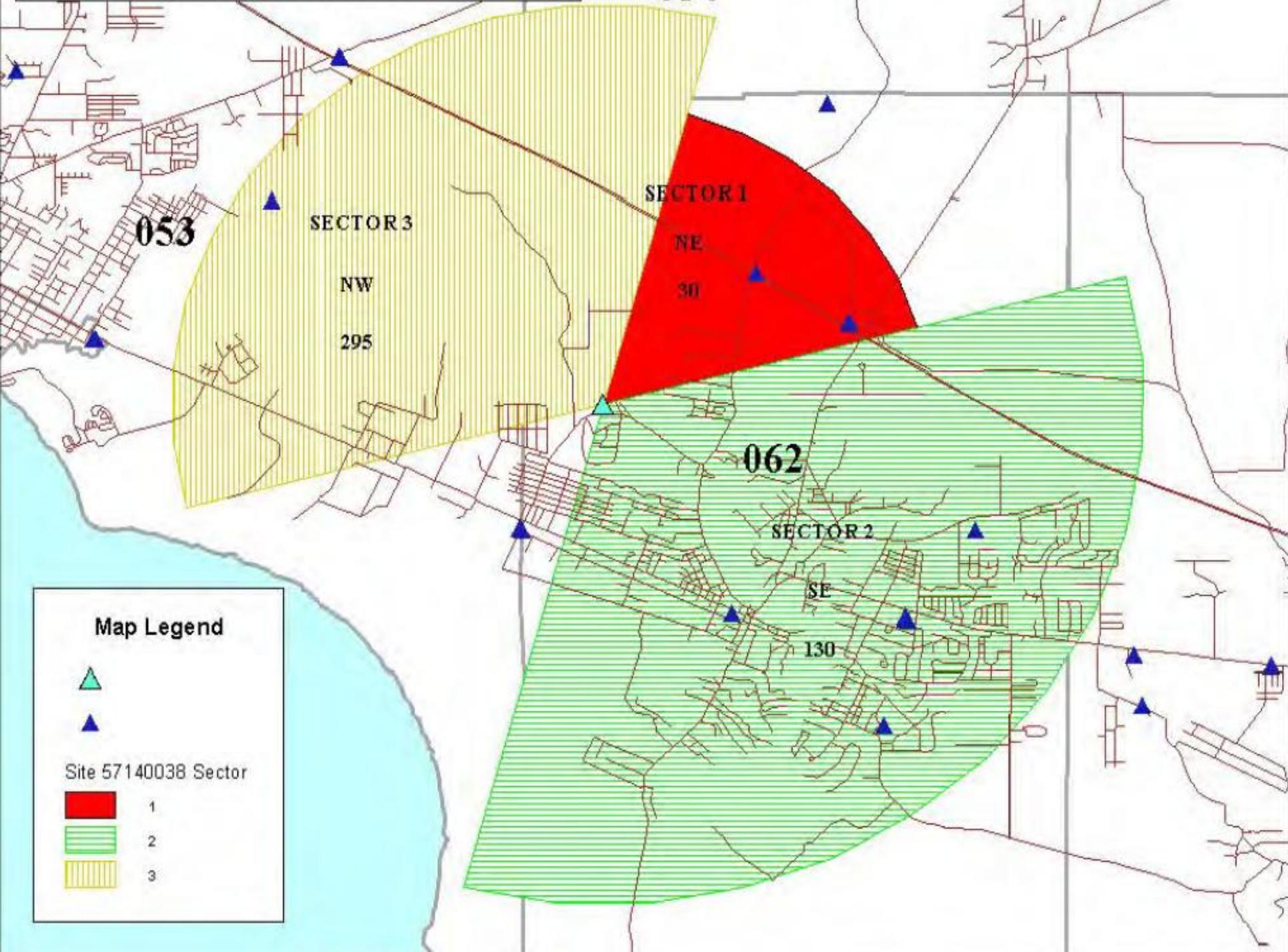


Wireless Location Technology



MSC Example





053

SECTOR 3

NW

295

SECTOR 1

NE

30

062

SECTOR 2

SE

130

Map Legend



Site 57140038 Sector



1

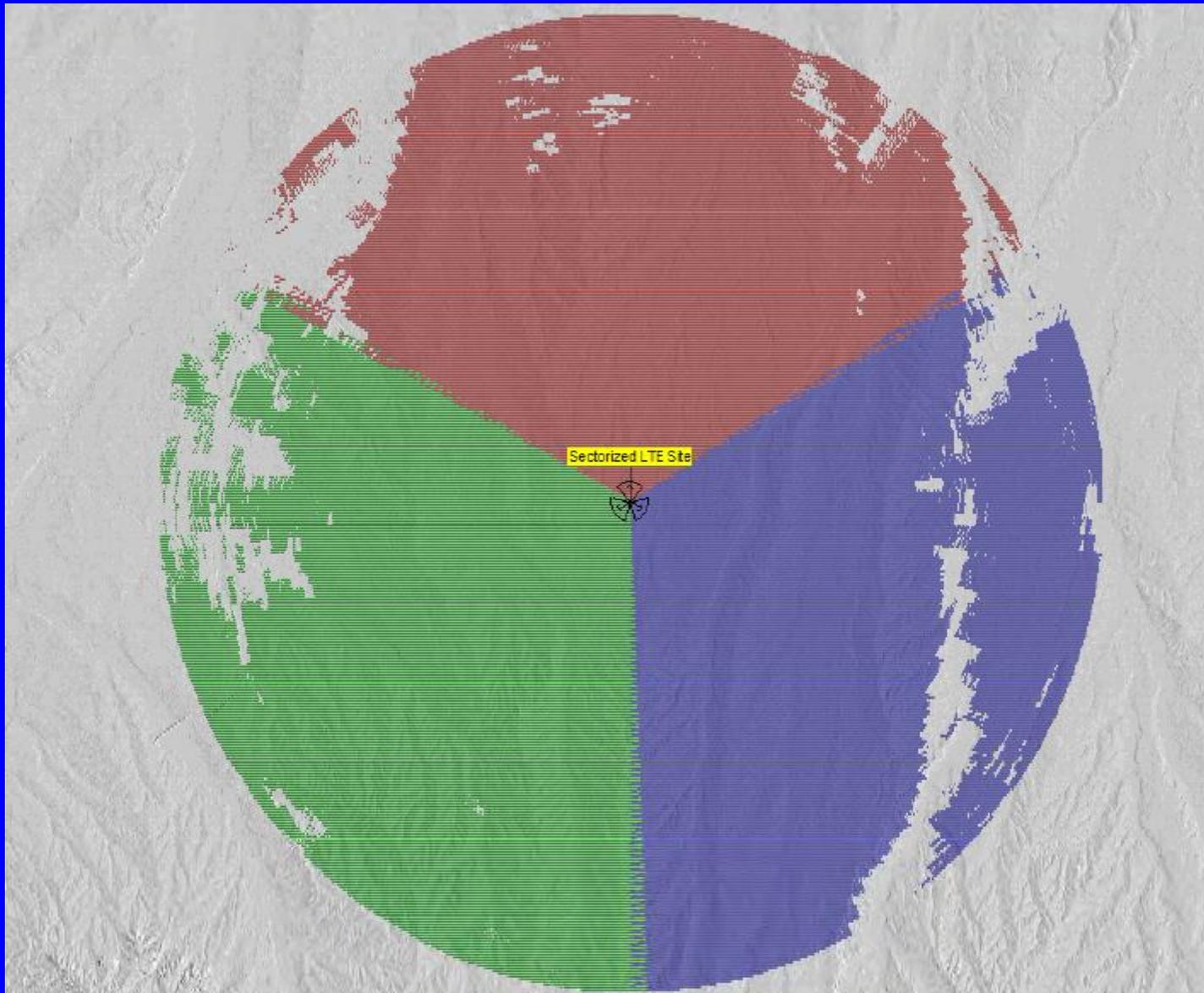


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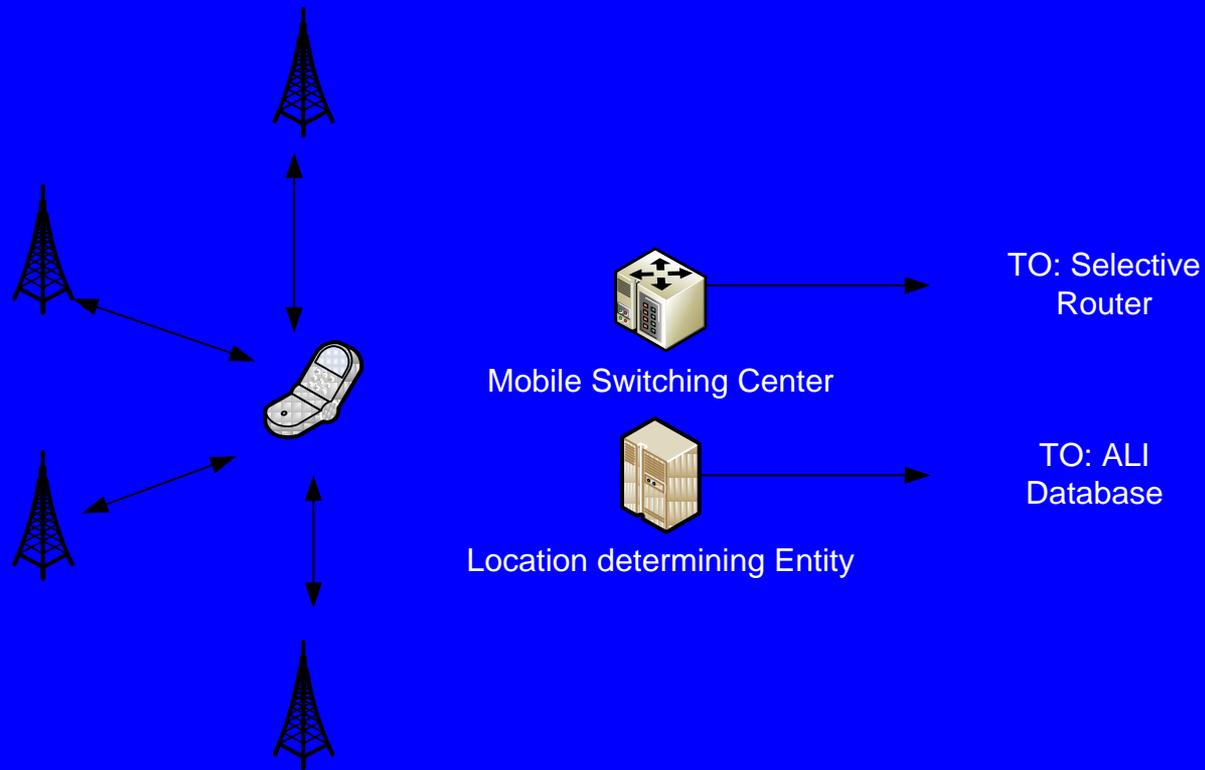


3

Coverage Sample



Triangulation/ Time Delay of Arrival



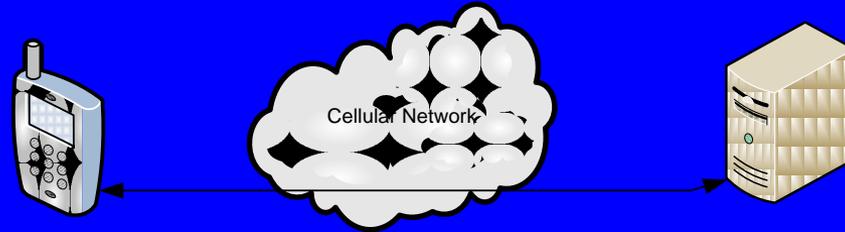
Smart Phone Applications (Apps)



How Do They Do It?

- Application on Smart Phone
- Network Communications
- Application Server
- Interaction
- Results

Getting Smart Location



Smart Phone App

Here I Am
Send Me a Map
I've Moved

Application Server

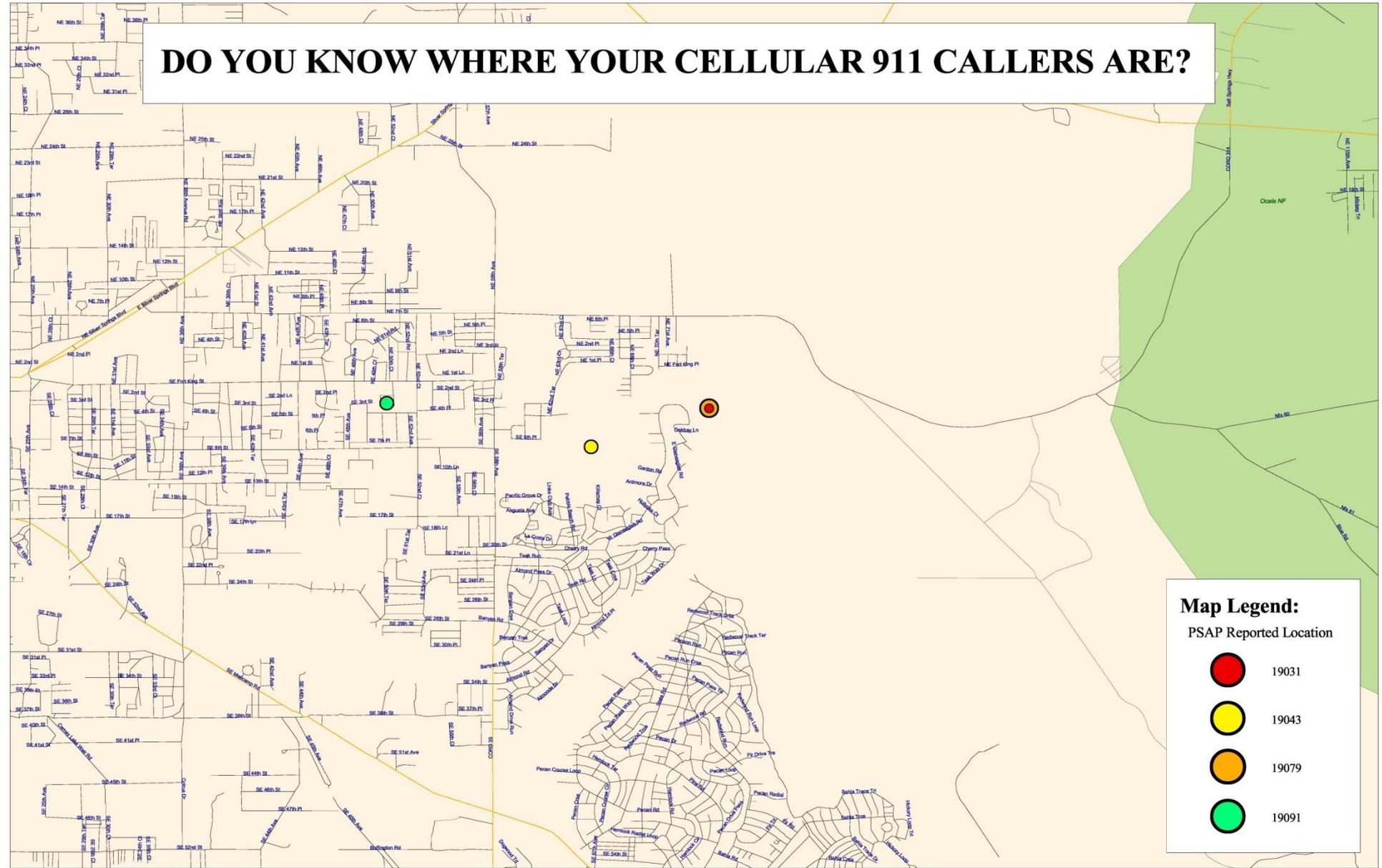
I See You
Here You Go
You Are Here Now



Moving Targets



DO YOU KNOW WHERE YOUR CELLULAR 911 CALLERS ARE?



Map Legend:
PSAP Reported Location

	19031
	19043
	19079
	19091

NO, DO YOU REALLY KNOW WHERE THEY ARE?

45 Meters

1425 Meters

3460 Meters

1180 Meters

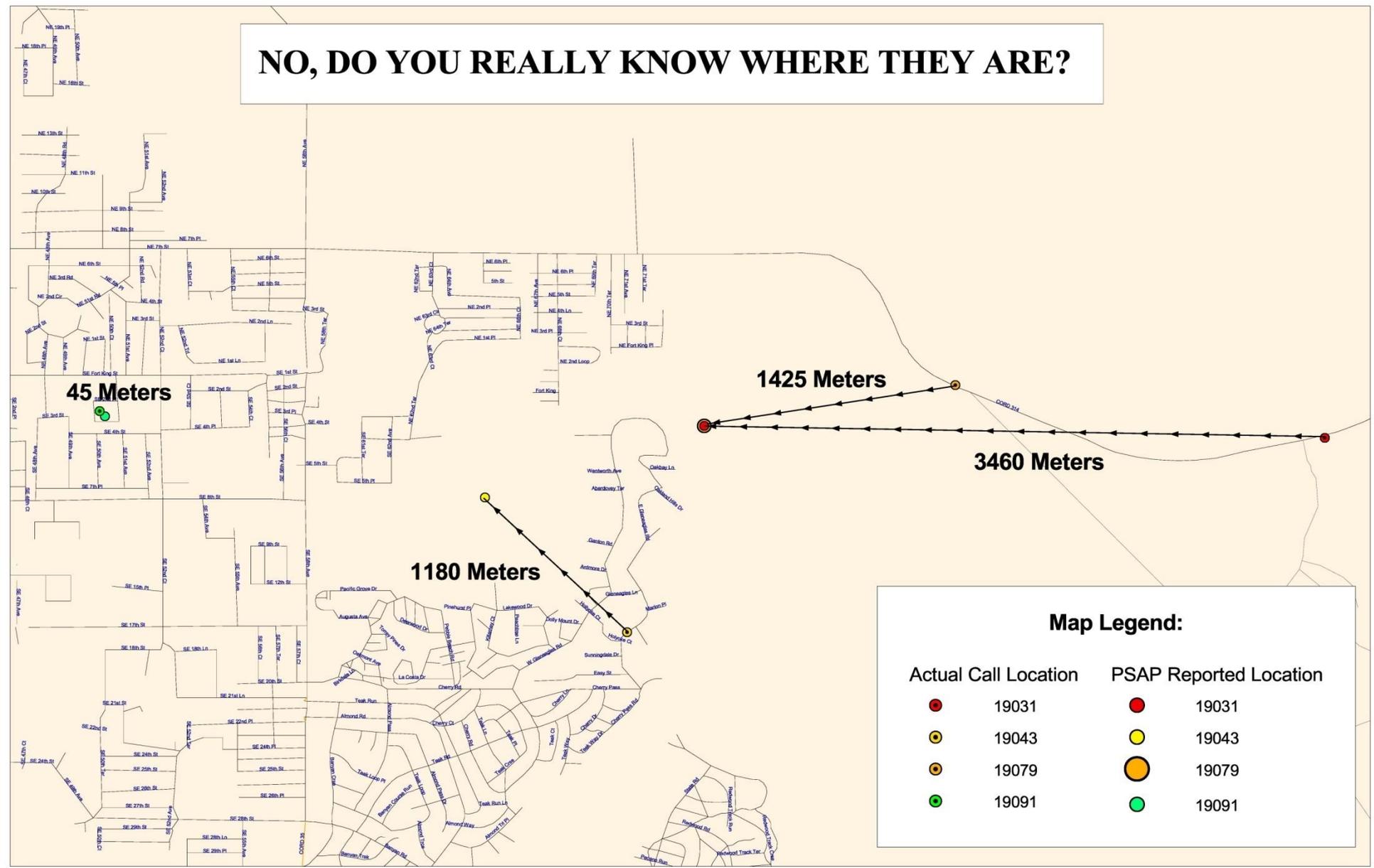
Map Legend:

Actual Call Location

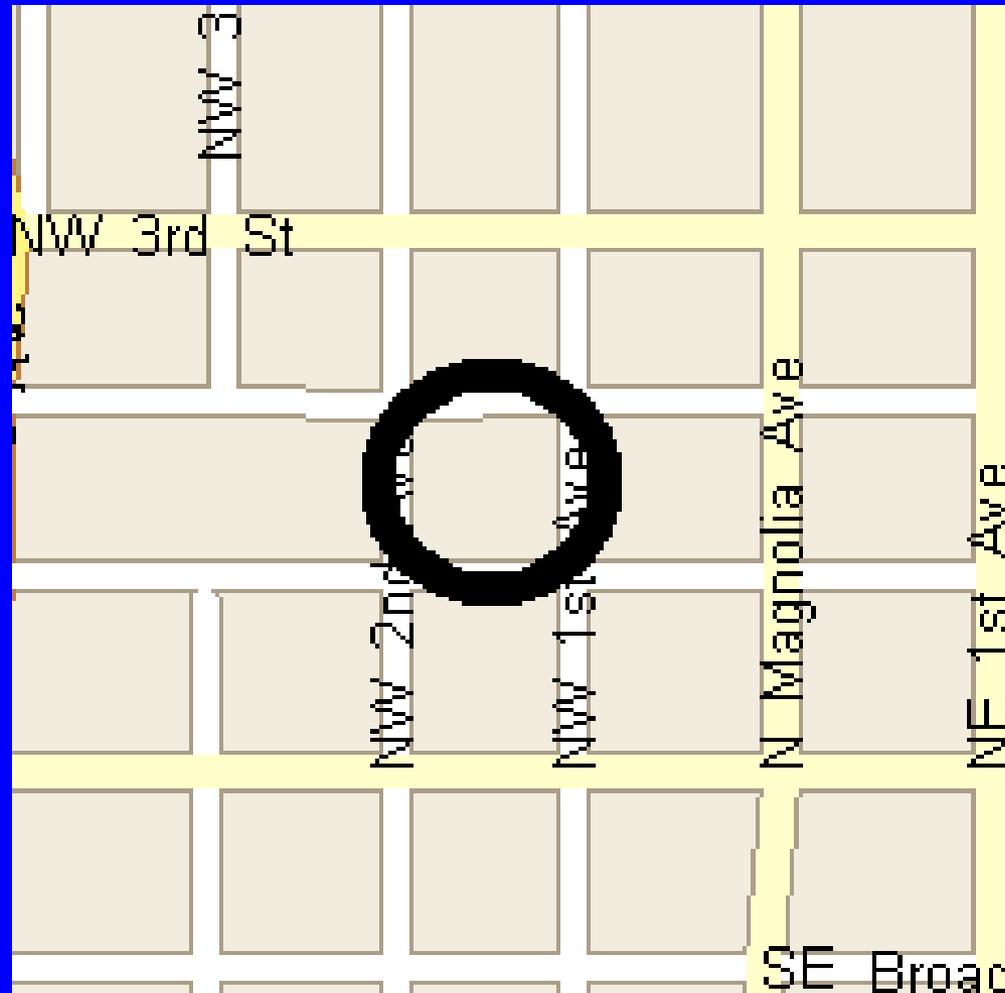
PSAP Reported Location

- 19031
- 19043
- 19079
- 19091

- 19031
- 19043
- 19079
- 19091



What 60 Meters Gets You



Improved 9-1-1 Location – When?



FCC's Communications Security, Reliability, and Interoperability Council (CSRIC)

GIS

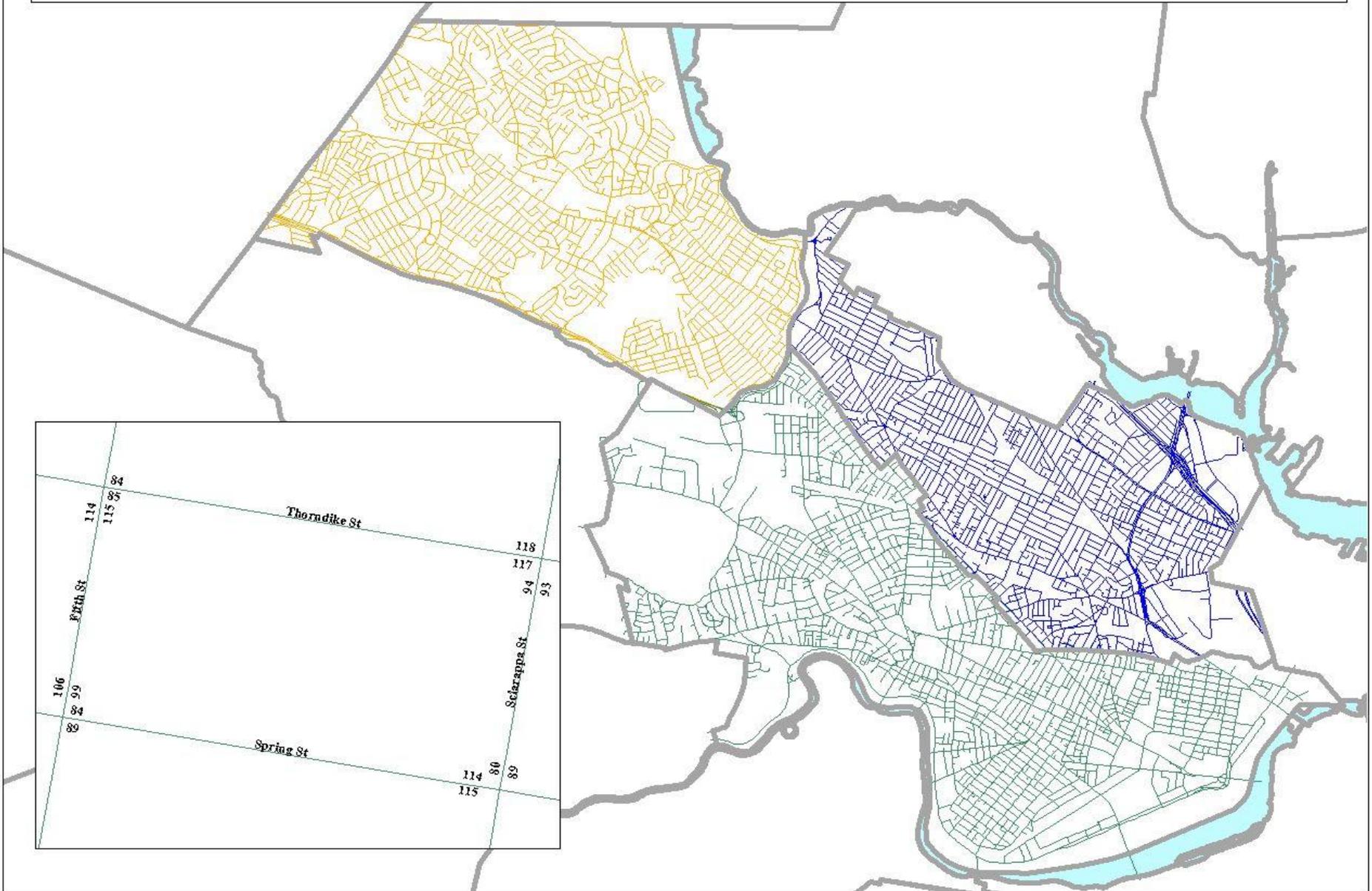
Pretty Good Ground Truth



Lacking Data

- 3566 Records
 - 0 Named Roads
 - 0 Address Range
 - 366 Landmarks
 - 285 Neighborhoods

Centerlines with MSAG Synchronized Names and Ranges

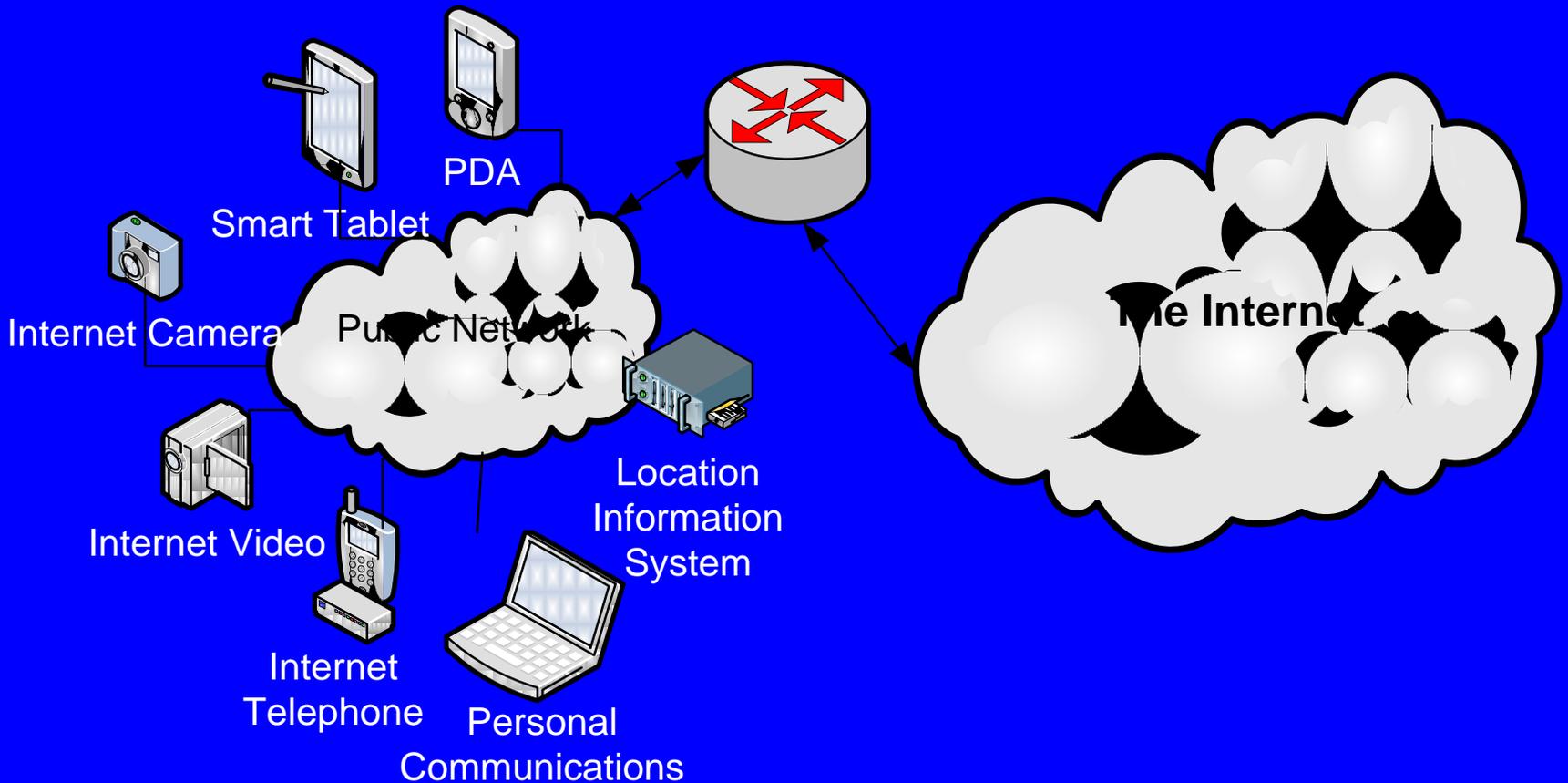


GIS Essential for Wireless 9-1-1

But Wait! There's More!

Emerging Consumer Communications

The Challenge



NG Acronyms

- Location Validation Function: LVF
- New routing determination function : Emergency Call Routing Function (ECRF)
- New routing element: Emergency Services Routing Proxy (ESRP)
- New element to hold location: Location Information Server (LIS)
- New security element: Border Control Function
- Gateways: from legacy wireline/wireless to this new world and from this new world back to an old PSAP

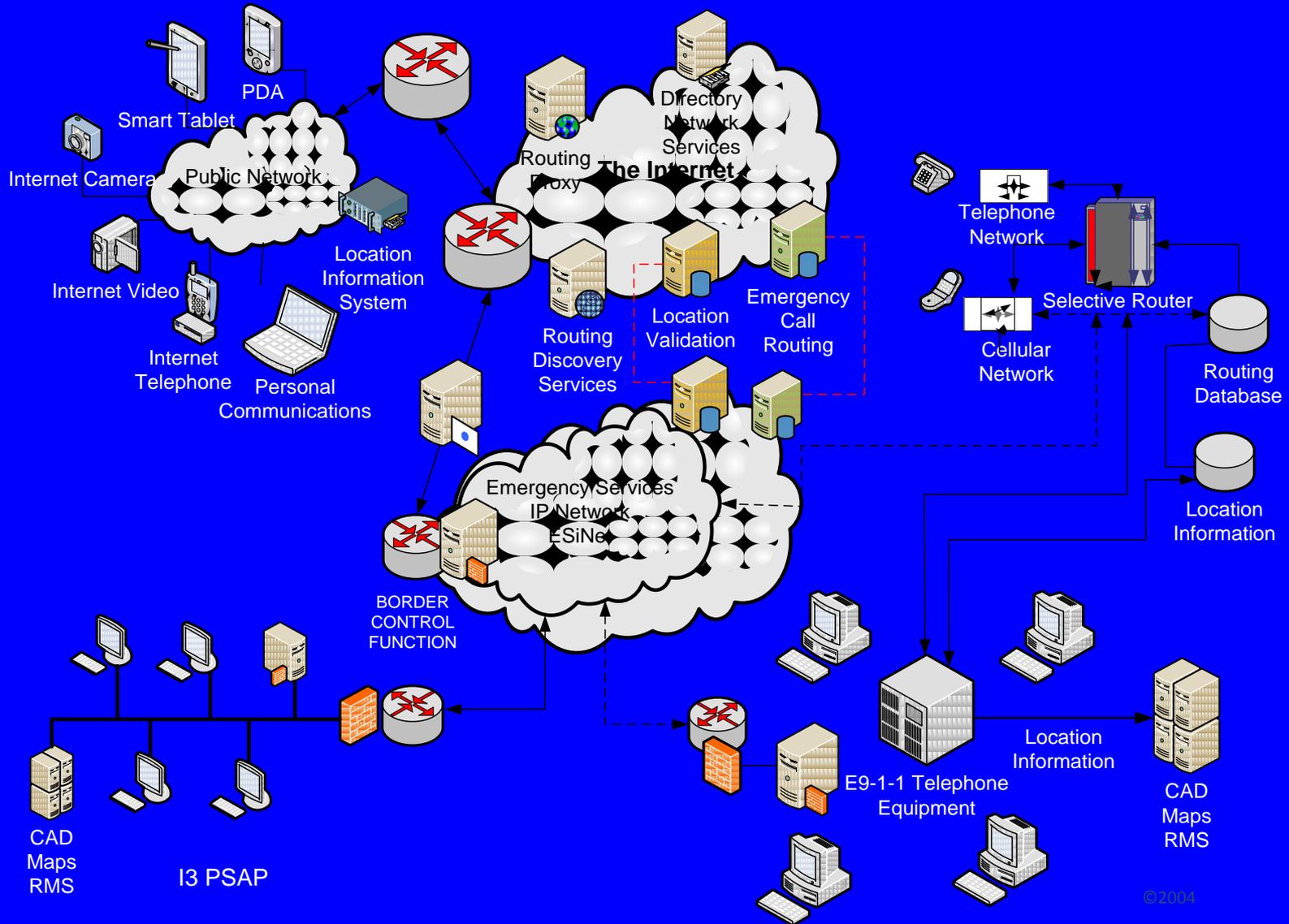
Analogies

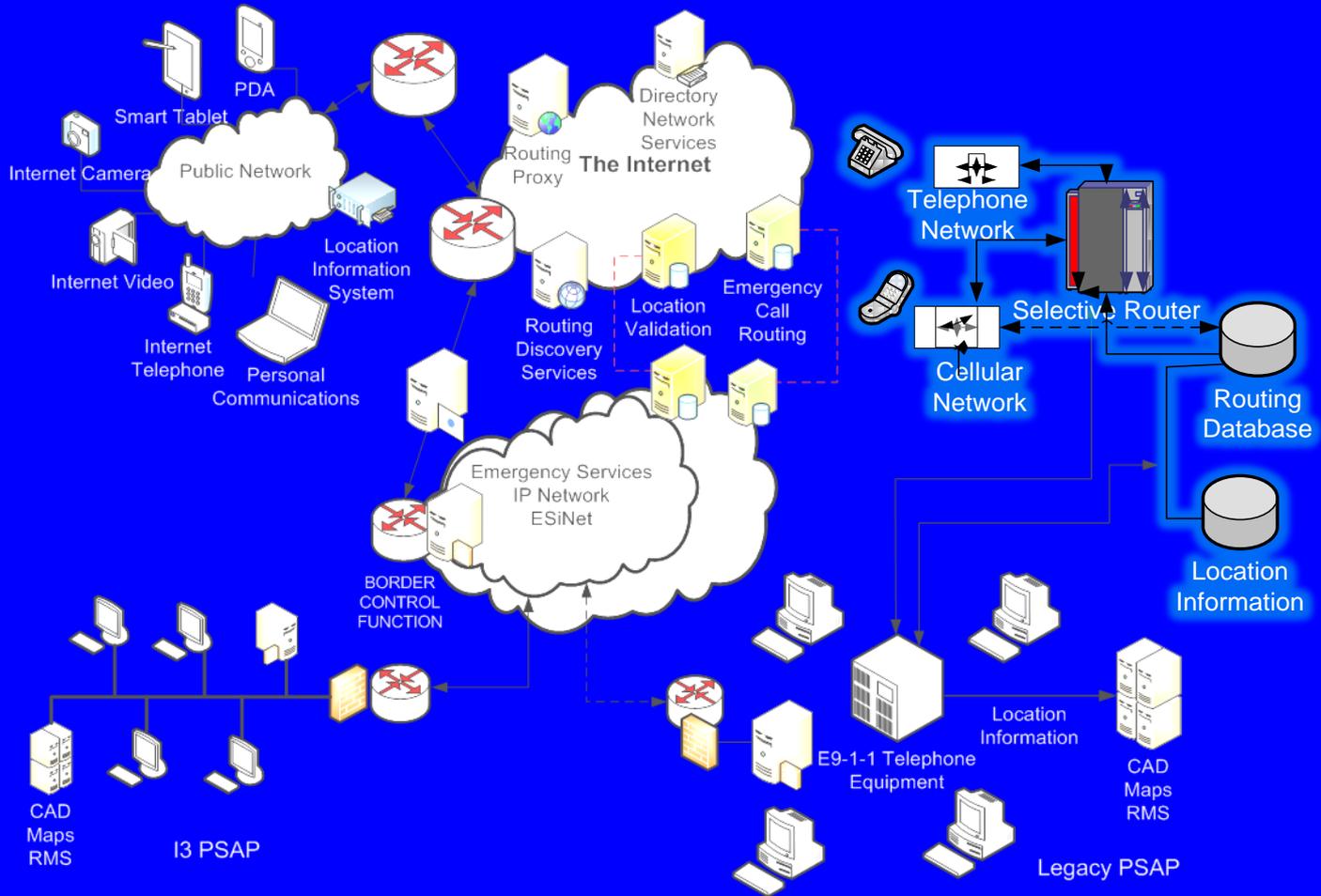
- Analog Circuits
 - Selective Router
 - MSAG based data
 - Limited to voice calls
 - Limited bandwidth
 - Custom interfaces for each service type
- IP networks (ESI-net)
 - IP based routing functions
 - GIS based data
 - Voice, text, video
 - Unlimited bandwidth
 - Standard IP interface for all service types

New Opportunities

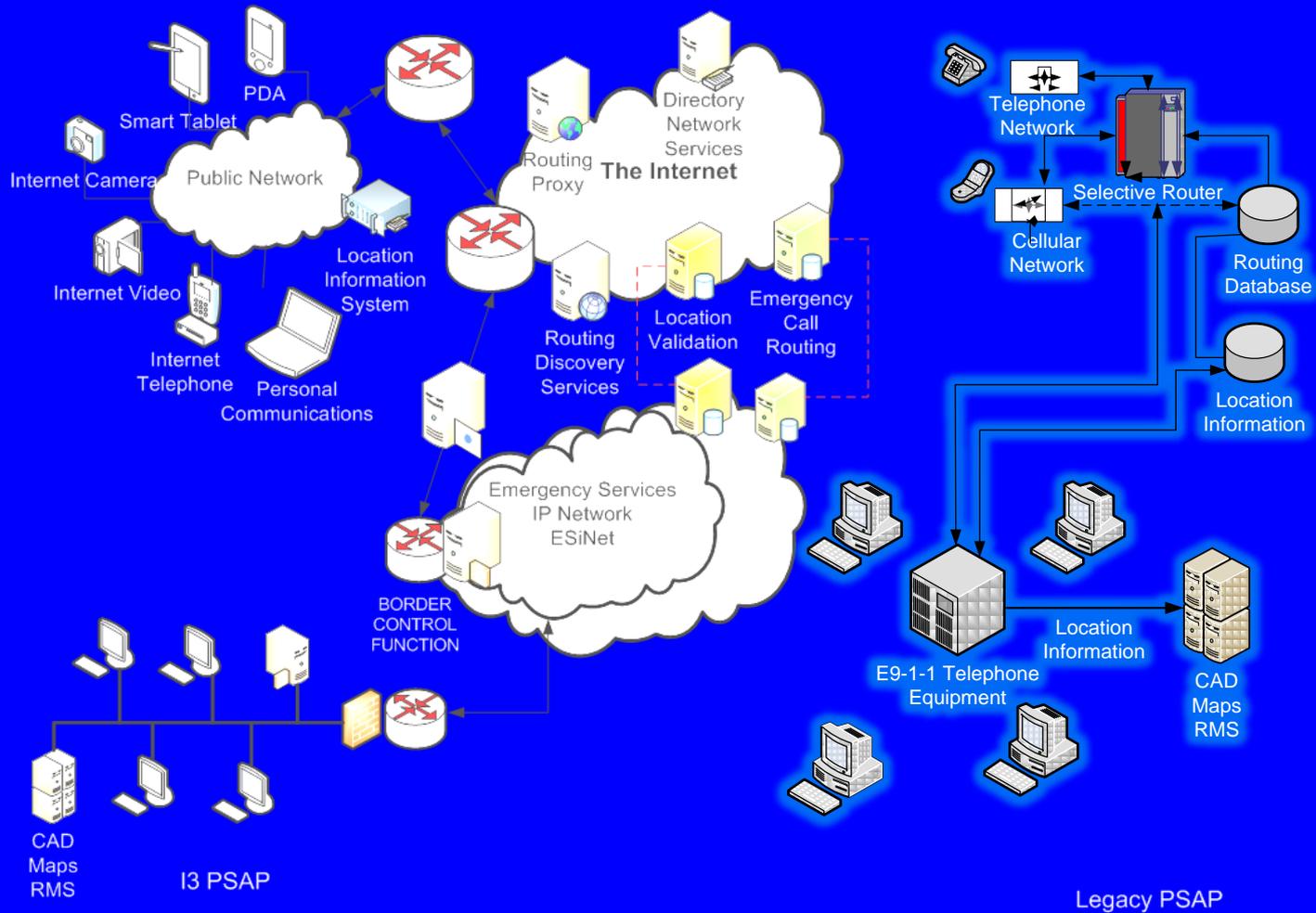
- GIS Based Routing Control
- Location Data Transported With The Call
- Non Traditional Calls And Messaging
- Supplemental Data
- Virtual PSAP Capabilities
- Rules Based Routing Options

i3 (NG9-1-1)

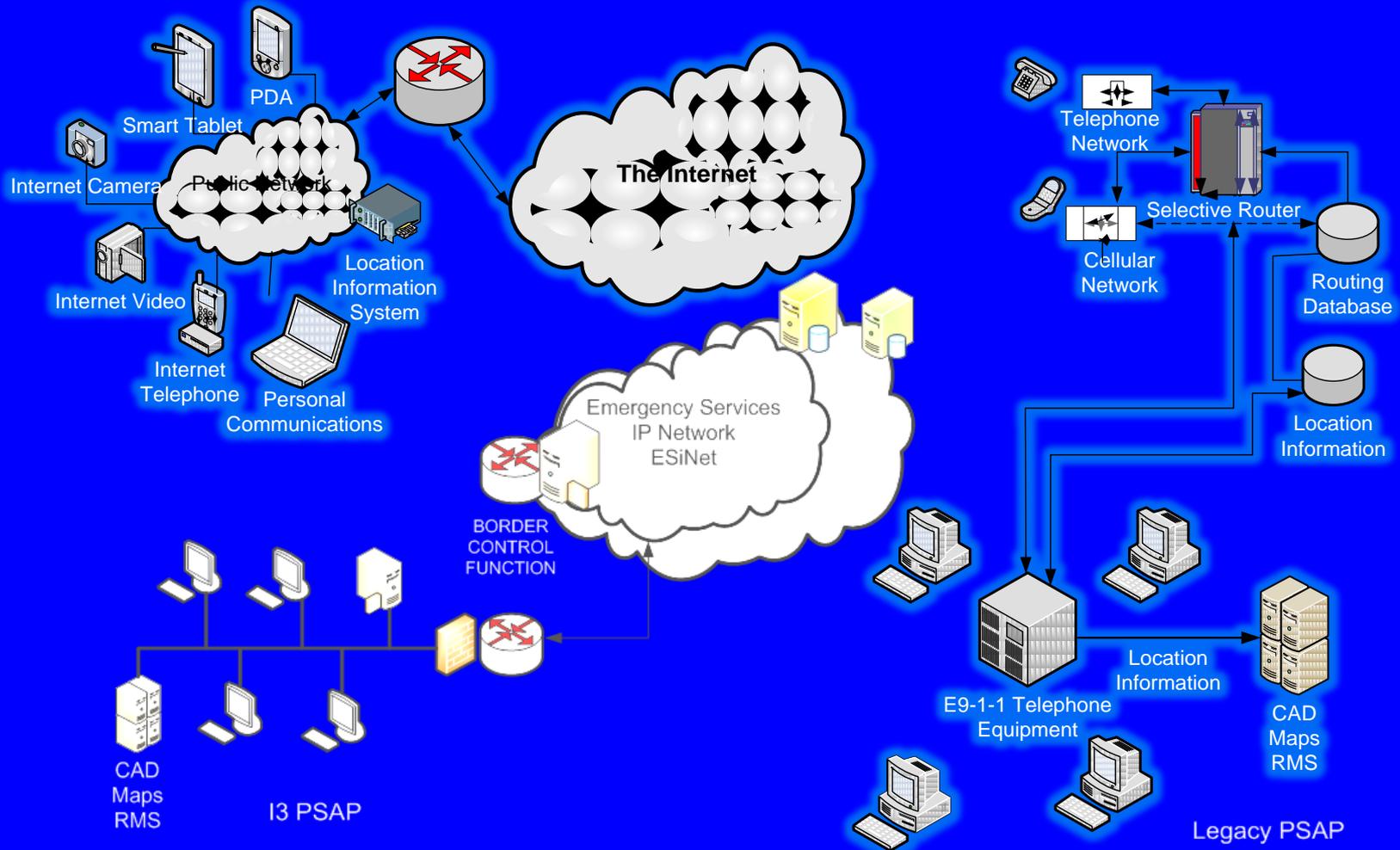




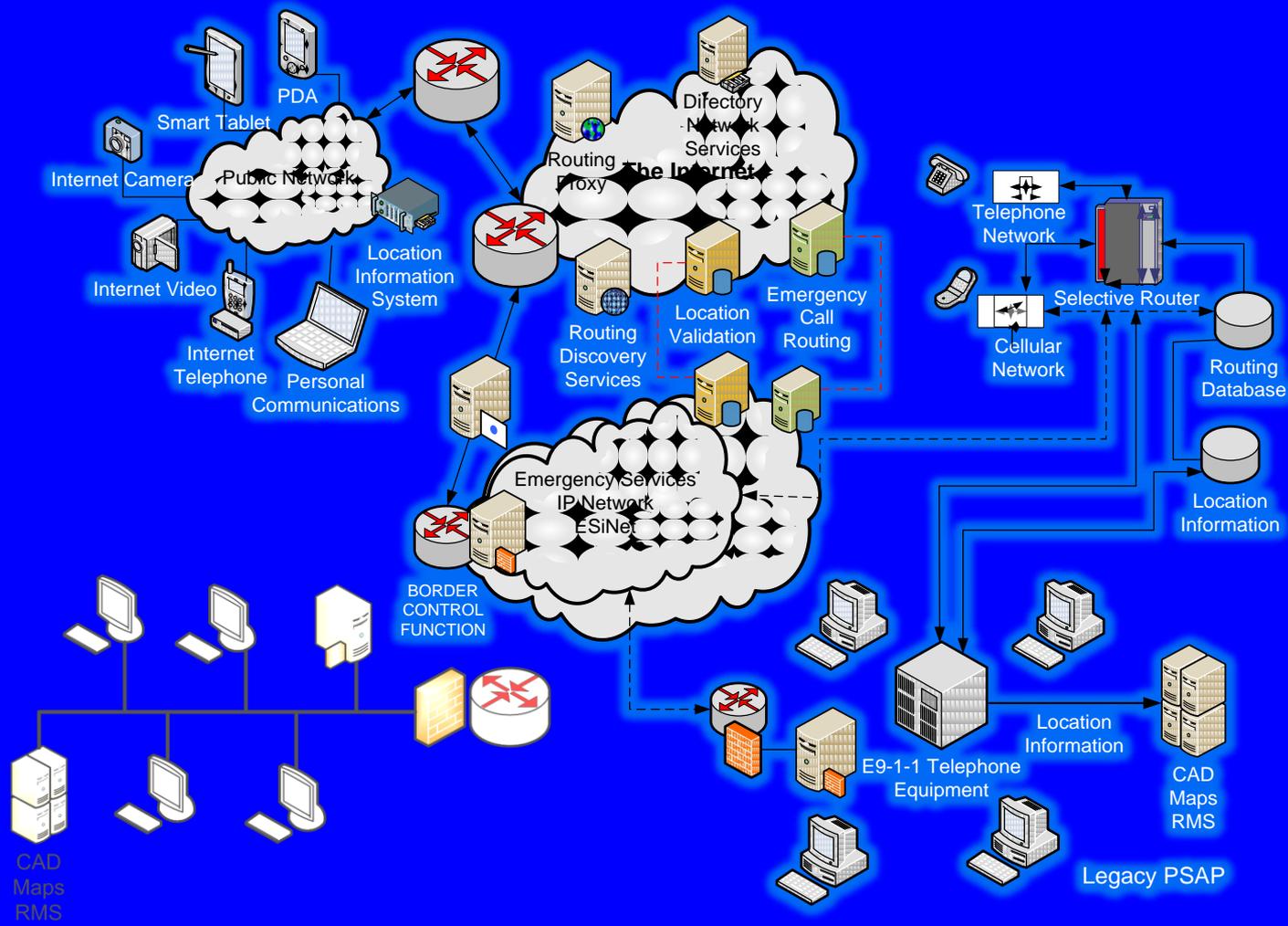
CURRENT NETWORK



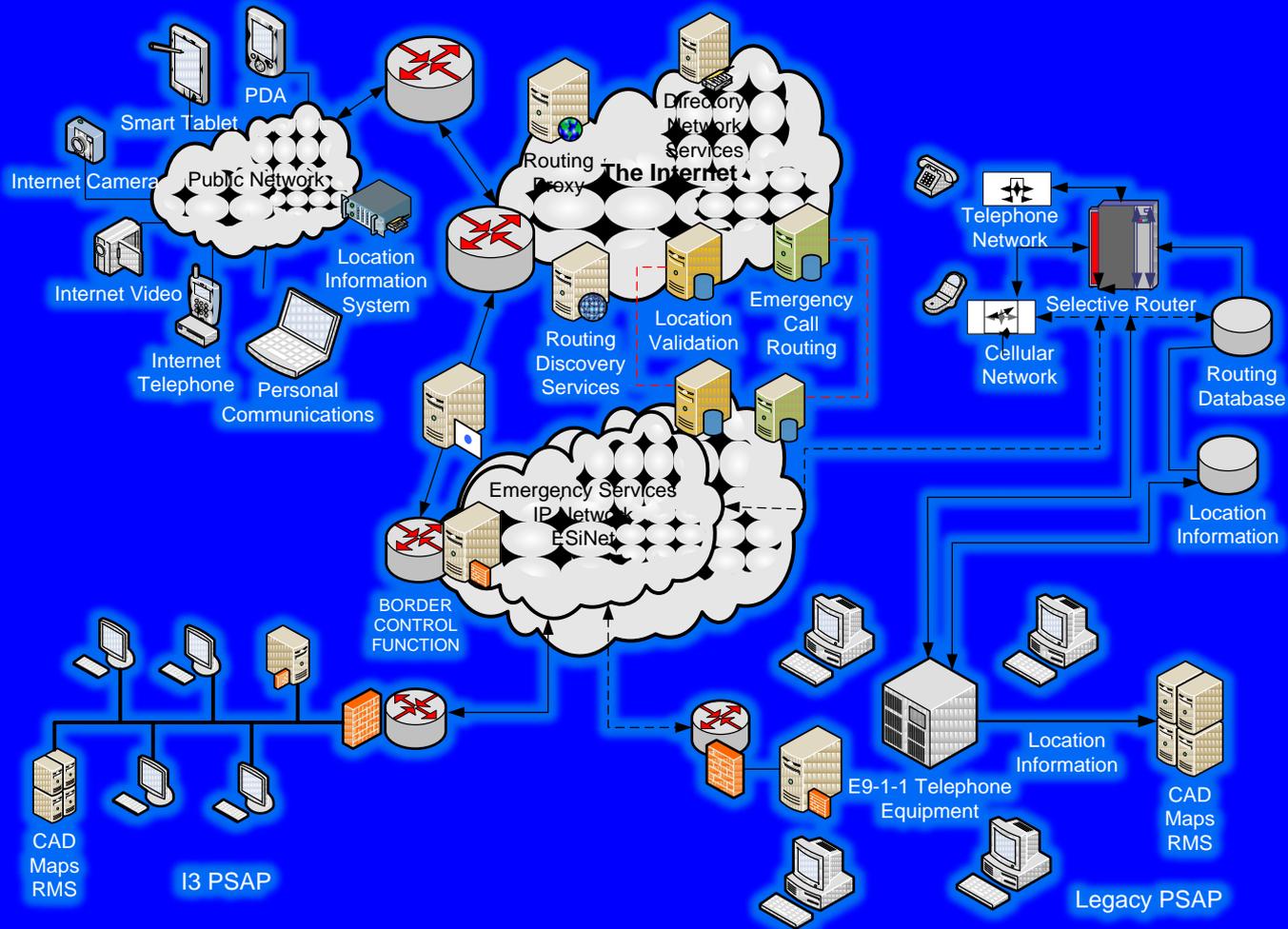
CURRENT NETWORK AND PSAP CONFIGURATION



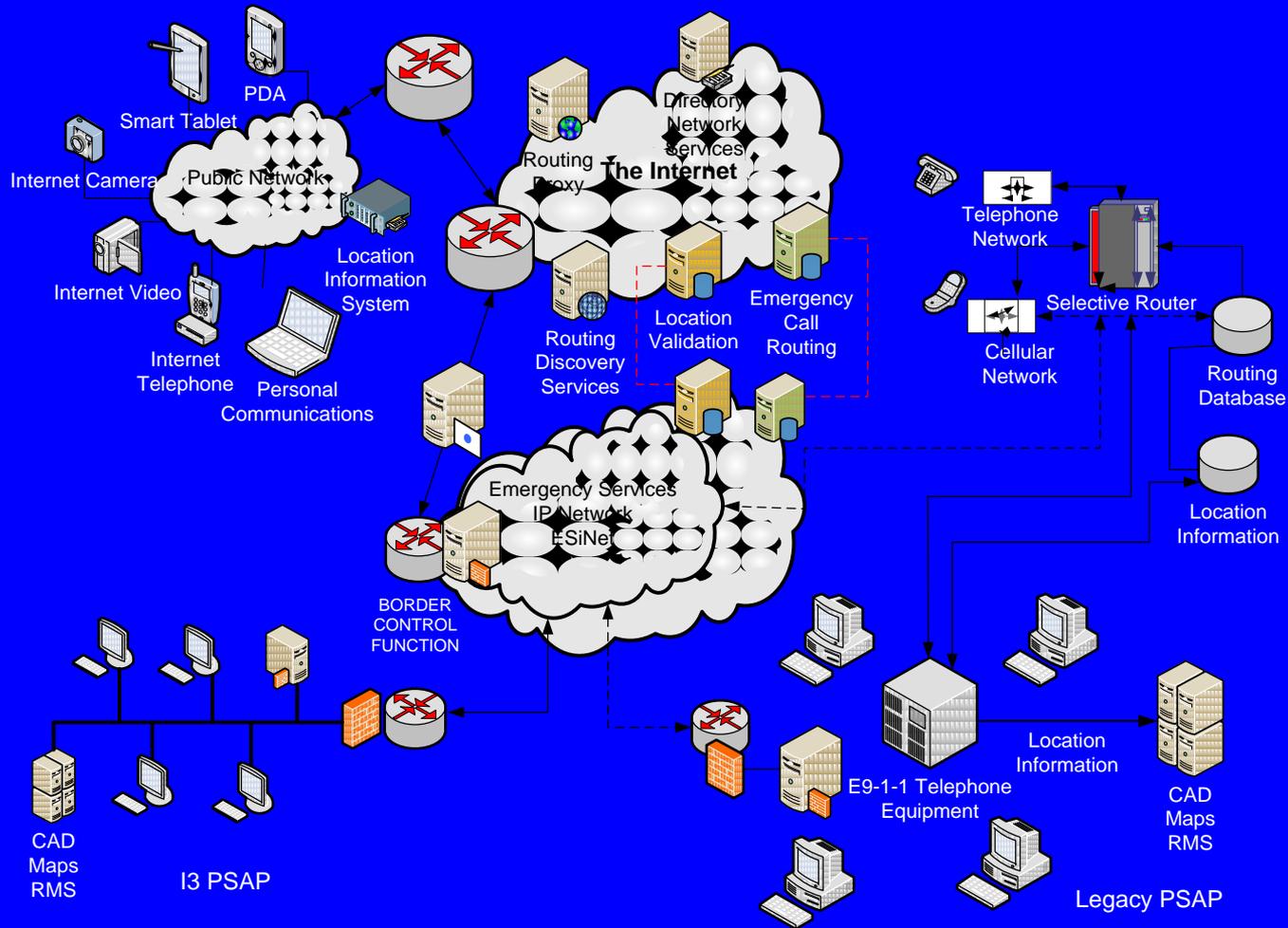
THE IP BARRIER



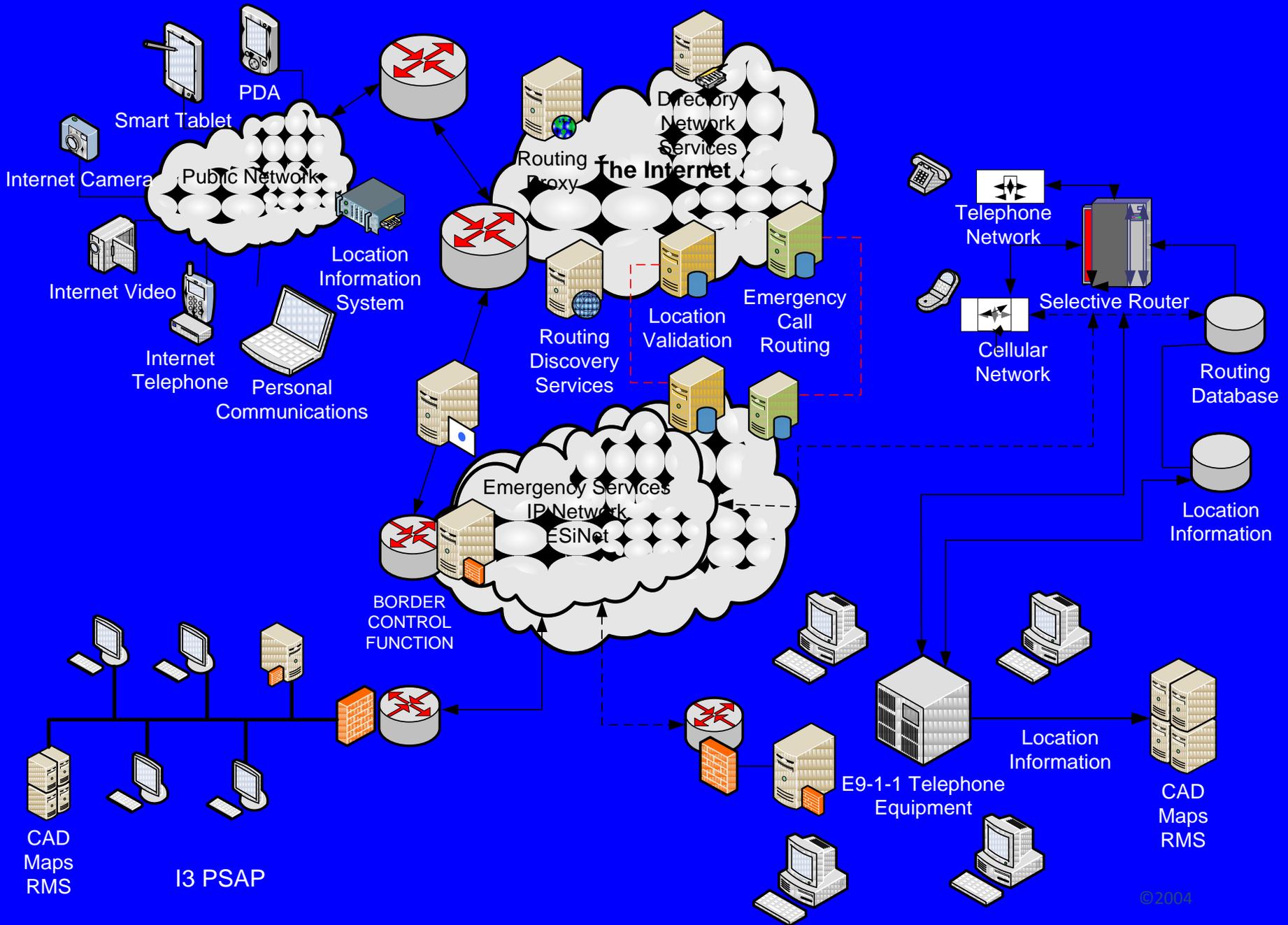
THE i2 SOLUTION



CONFORMING TO NEXT GENERATION



NEXT GENERATION NETWORKING



Roundtable

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