



# Studies and Applications of the Smart Regional/Urban Models 区域/城市智能模型的研究与应用

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中国 上海

A photograph of the Shanghai skyline at sunset, featuring the Oriental Pearl Tower and other skyscrapers.



# 区域/城市 智能模型

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模型面向的问题

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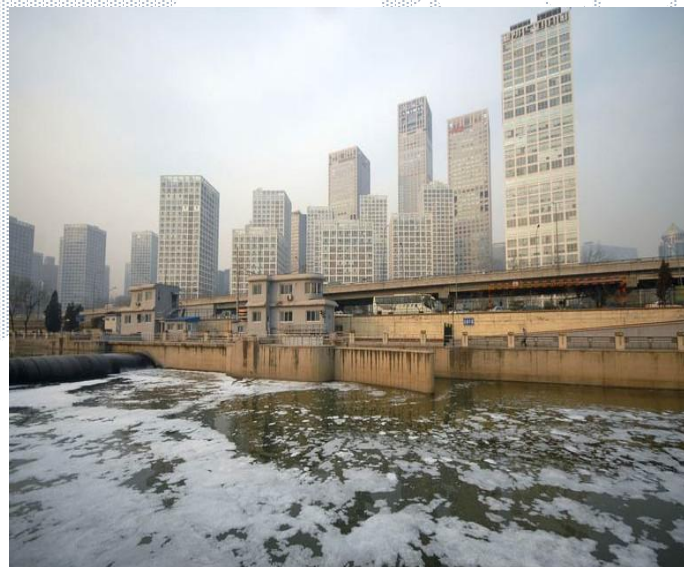
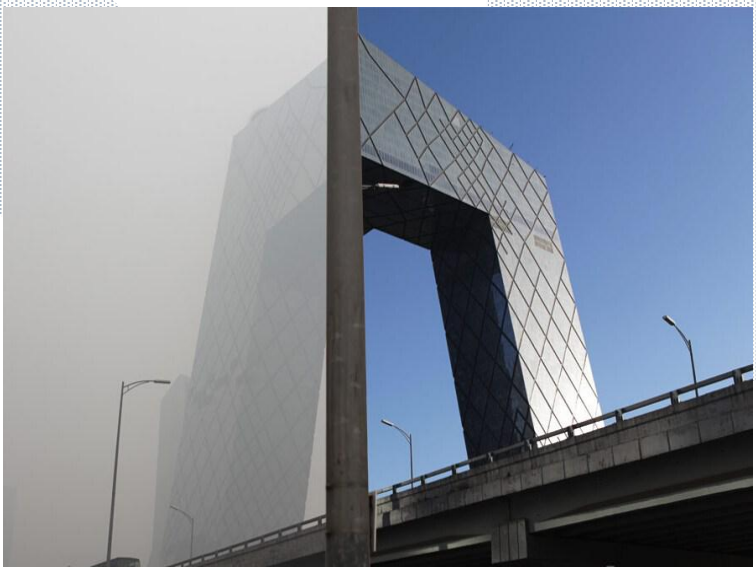
展望

# 模型面向的问题

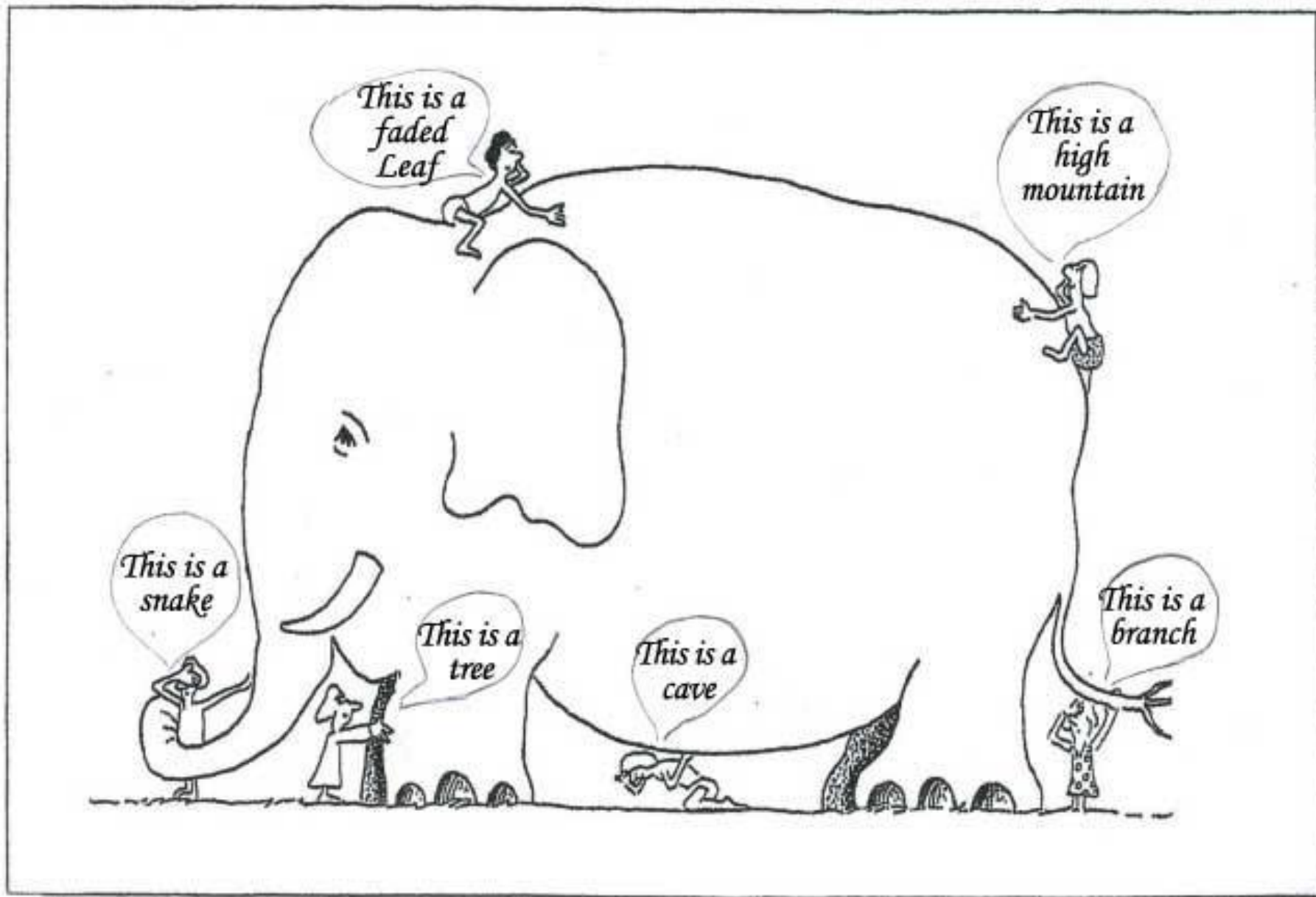
中国城镇化快速发展过程中产生的问题

传统的城市研究与模型本身的问题





智能城市/区域信息模型 ( **CIM/RIM** ) 致力解决中国城镇化快速发展过程中面临的问题



*6 blind men describe an elephant (old indian fable)*

# 前期的研究与应用

南加州规划模型的结构与应用

南加州货运模型的开发与更新

2



## Introduction (介绍)

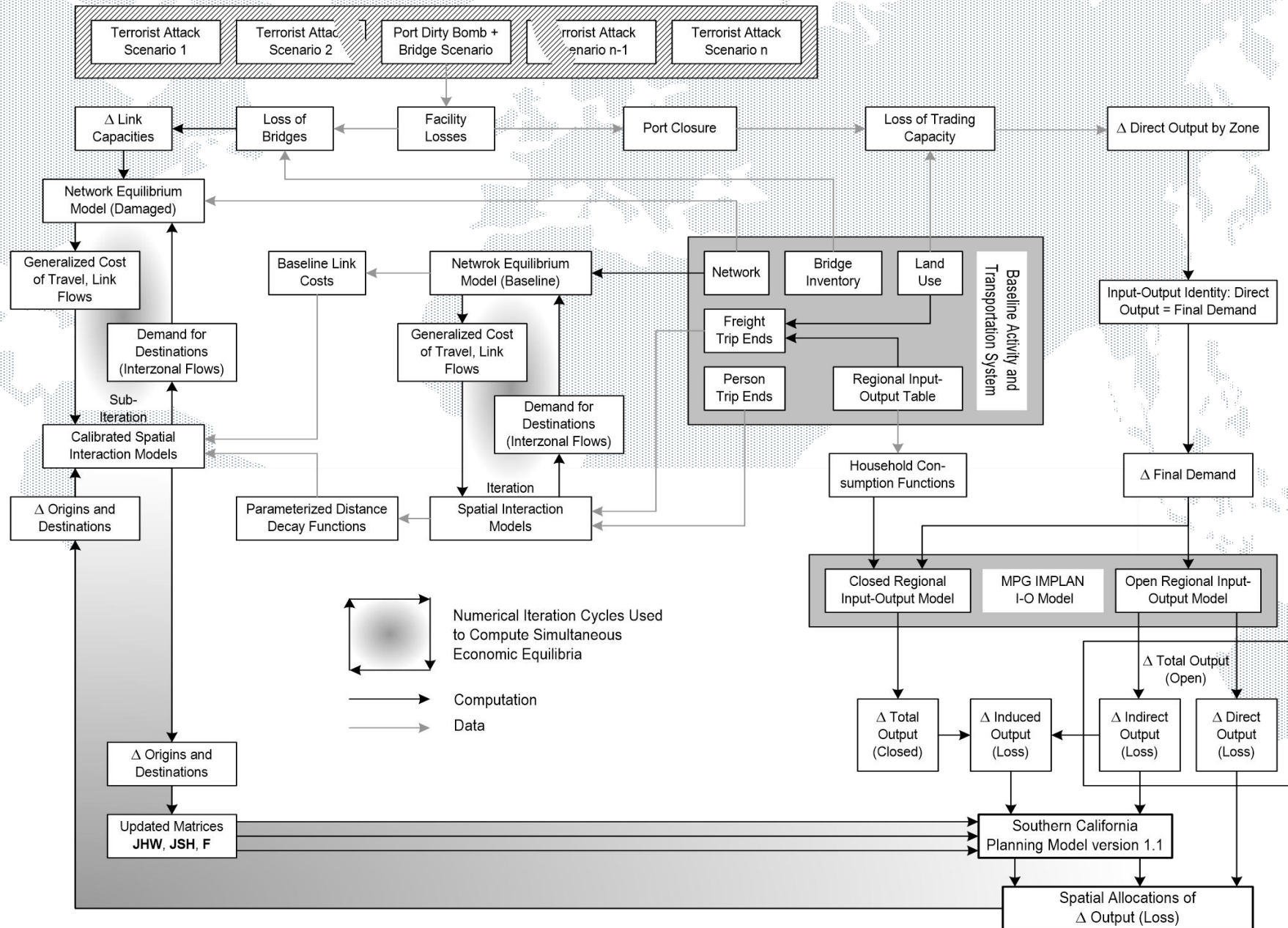
- Southern California Planning Model (SCPM) is a GIS-based regional input-output model that reports results in considerable spatial detail. 南加州规划模型 (SCPM)是建立在GIS平台上的空间投入产出模型。
- It was initially developed by Gordon, Richardson and their colleagues at University of Southern California (USC) in the early of 1990s (Richardson, et al. 1993; Gordon, Richardson and Davis, 1998). Various versions of SCPM have been developed since then. 该模型是上世纪90年代初由南加州研究小组开发并持续更新和应用至今。
- This model addresses the problem of spatial economic impact analysis within the five-county area of the Los Angeles Metropolitan region. 模型最初是对大洛杉矶地区5个郡内的规划政策的空间经济影响进行评估。
- It has been widely applied in Los Angeles, Houston and some other regions and steadily updated over the years as new and revised data sources became available. 在休斯敦等城市也建立了类似的模型，并且不断更新和应用。

## General Methodology of SCPM (模型的主要方法)

- SCPM incorporates a regional economic input-output model linked to a spatial allocation model on a Geographic Information System (GIS) platform. 模型将经济学的投入产出模型与空间交互模型在地理信息系统的平台上相结合。
- The economic input-output model is used to estimate the indirect and induced effects of a plan, project or policy. 模型可评估规划、项目、与政策的直接与间接影响。
- The direct effects are allocated to the impacted areas, the indirect effects are allocated to zones according to base-year proportions, and the induced effects, i.e., the effects resulting from household expenditure changes, are distributed spatially throughout the entire region via the spatial allocation model. 模型的空间交互功能能够估计各种影响的空间分布。
- The results generated by SCPM were detailed economic impacts in terms of jobs or dollar values of output by sector and by sub-regional zone. The latter are typically local cities and other communities. 模型的结果表示为对规划小区中各个产业部门的就业（人数）或产出（价值）的影响。



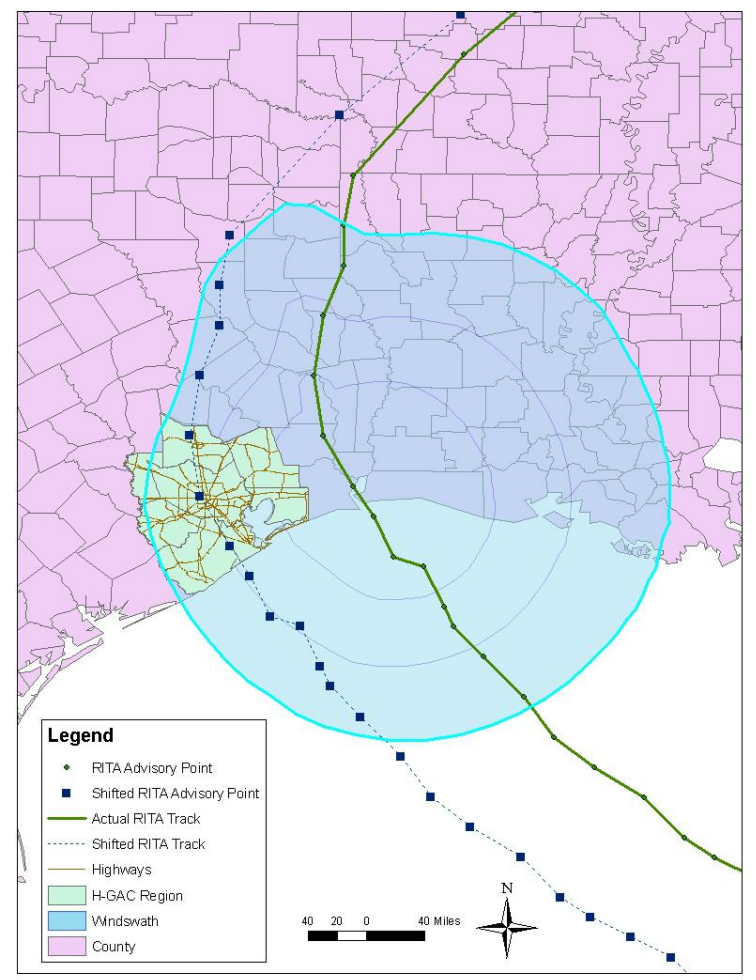
# Data Flows and Model Structure (数据流与模型结构)



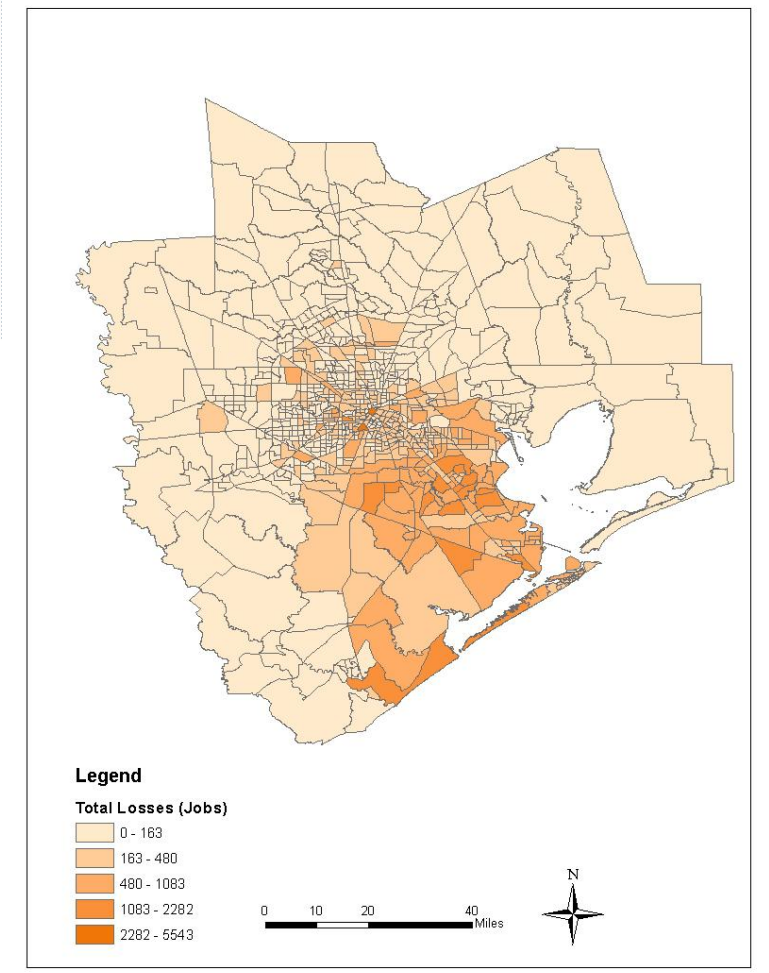
# Hypothetical Hurricane Attack on Houston-Galveston (假想的飓风侵袭休斯敦)



飓风灾害

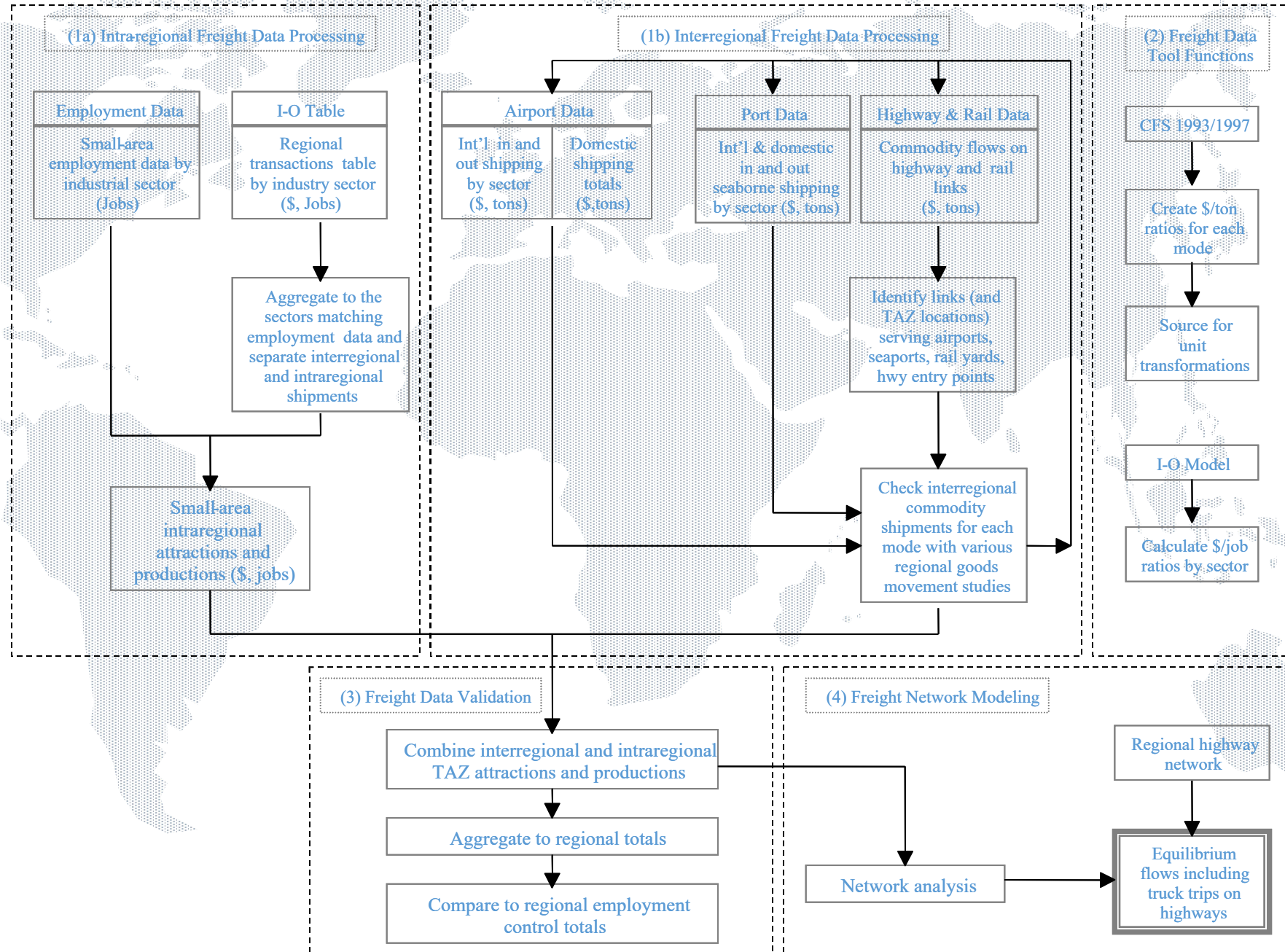


假想的飓风路径

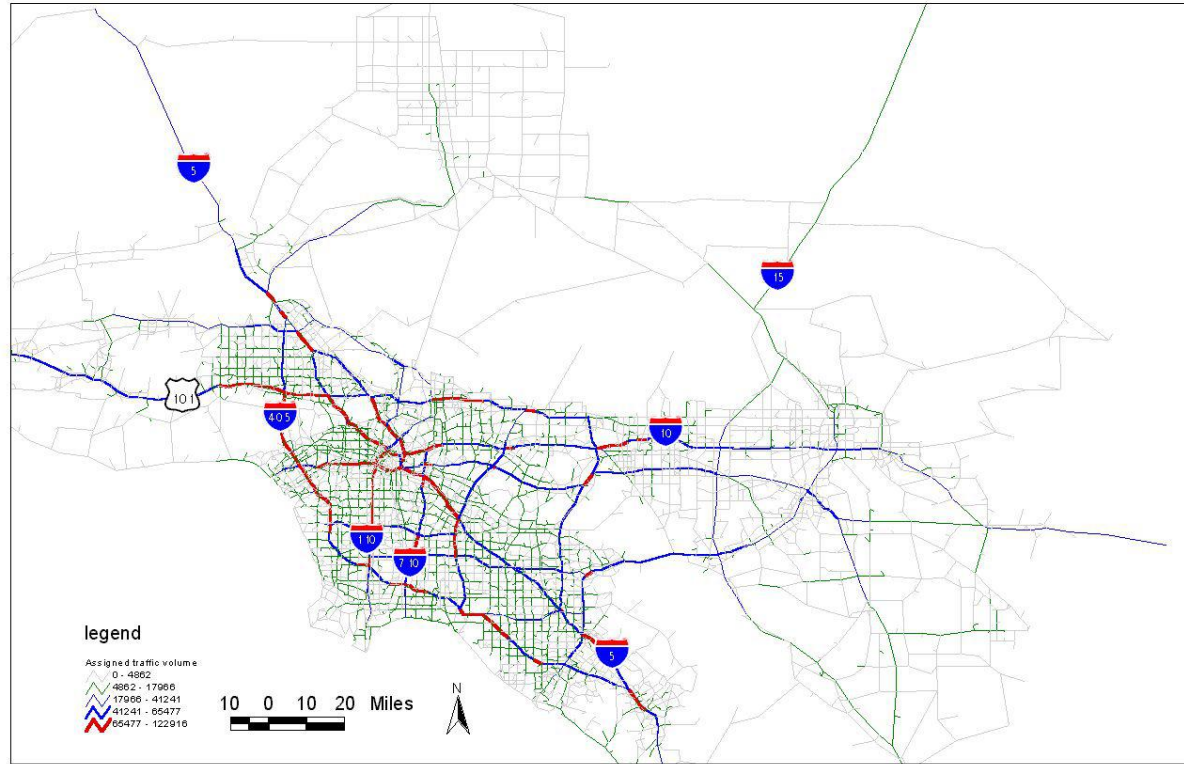


假想的飓风造成的就业损失

# The general framework of the freight modeling system (南加州货运模型的基本结构)



Assigned Total Traffic Volume (Passenger + Freight)  
in the Five-County LA Region  
南加州客运与货运总量



Assigned Freight in the Five-County LA Region  
南加州货运总量

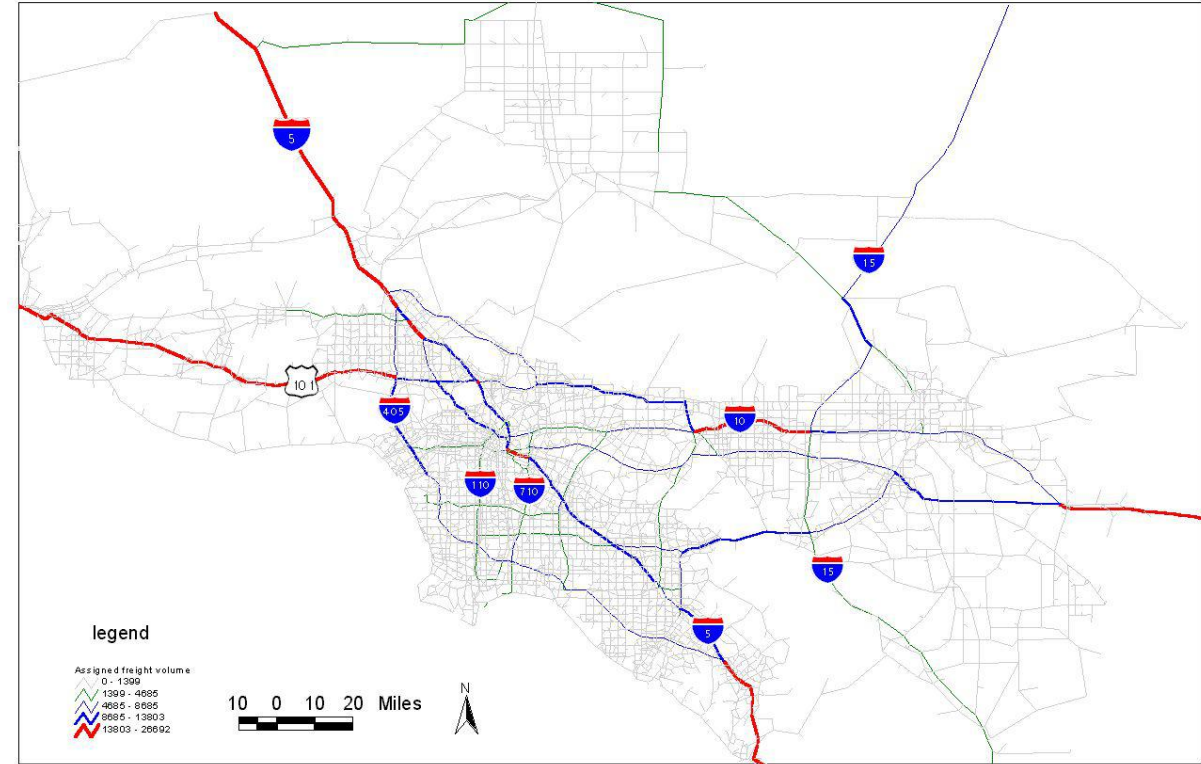


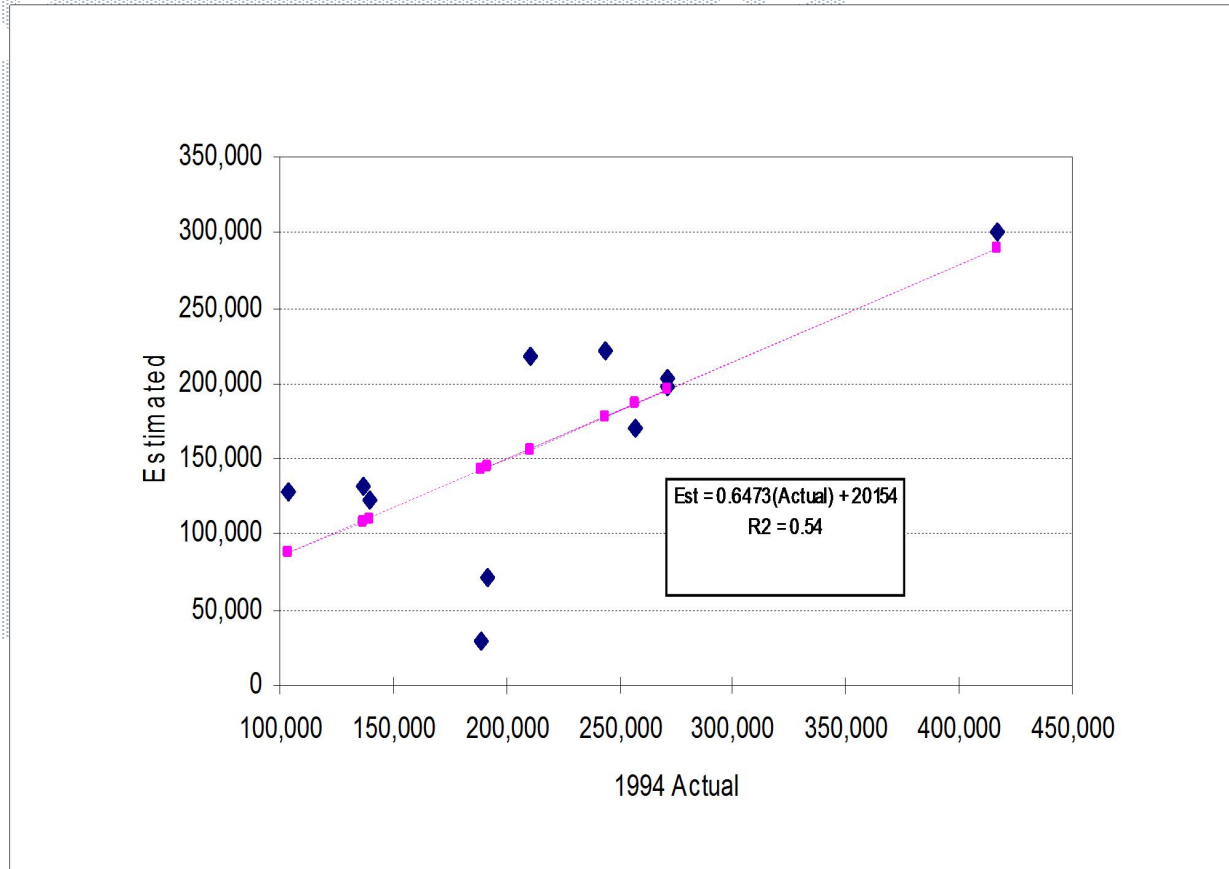
Figure 5. Assigned Total Traffic Volume (Passenger + Freight) in the Five-County LA Region

### Traffic Assignment Validation (模型估计与实际的货运量的比对)

Screenline	'94 Actual	SUE Model	Difference	% Difference
1	243,355	222,639	-20,716	-9%
2	417,095	299,786	-117,309	-28%
3	191,999	71,524	-120,475	-63%
4	257,020	169,547	-87,473	-34%
5	271,040	203,560	-67,480	-25%
6	210,832	217,482	6,650	3%
7	188,652	28,737	-159,915	-85%
8	271,487	197,476	-74,010	-27%
9	103,915	129,089	25,174	24%
10	136,633	132,738	-3,896	-3%
11	139,756	123,152	-16,604	-12%

Note: It is a comparison of SUE Model Estimates and 1994 Actual HDT Using SCAG PCE, 24-hr PCEs

### Estimated and Actual Screenline HDT, 24 hrs, in PCEs (模型估计与实际的货运量的回归分析)



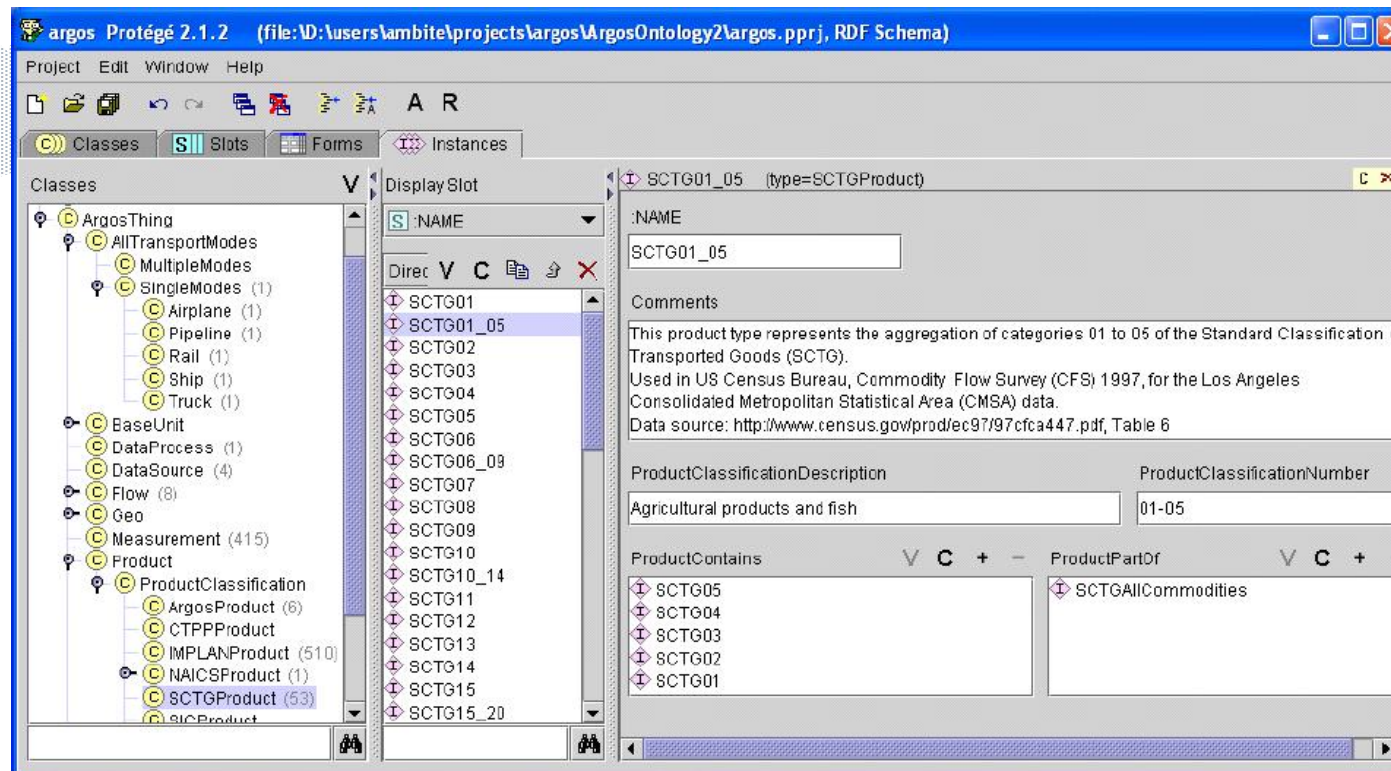
# Freight data auto updates (货运数据的自动更新)

The screenshot shows a Windows Internet Explorer browser window displaying the LAX Statistics website. The browser's address bar shows the URL [http://www.lawa.org/welcome\\_LAX.aspx?id=602](http://www.lawa.org/welcome_LAX.aspx?id=602). The website header includes the LAX logo and navigation links for LAWLA, LAX, ONT, VNY, PMD, and HOME. A secondary navigation bar lists categories like Airlines & Flights, Parking, Ground Transportation, Airport Info & Services, Airport Condition, AiRadio 530, and Lost & Found. On the left side, there is a 'Current Weather' section with a temperature of 68.0 F (20.0 C) and a 'Real-Time Flight for Mobile Device' search box. The main content area features a banner for 'Airport Information' and a section titled 'Statistics — Ten Year Summary — Air Freight'. This section contains a table with the following data:

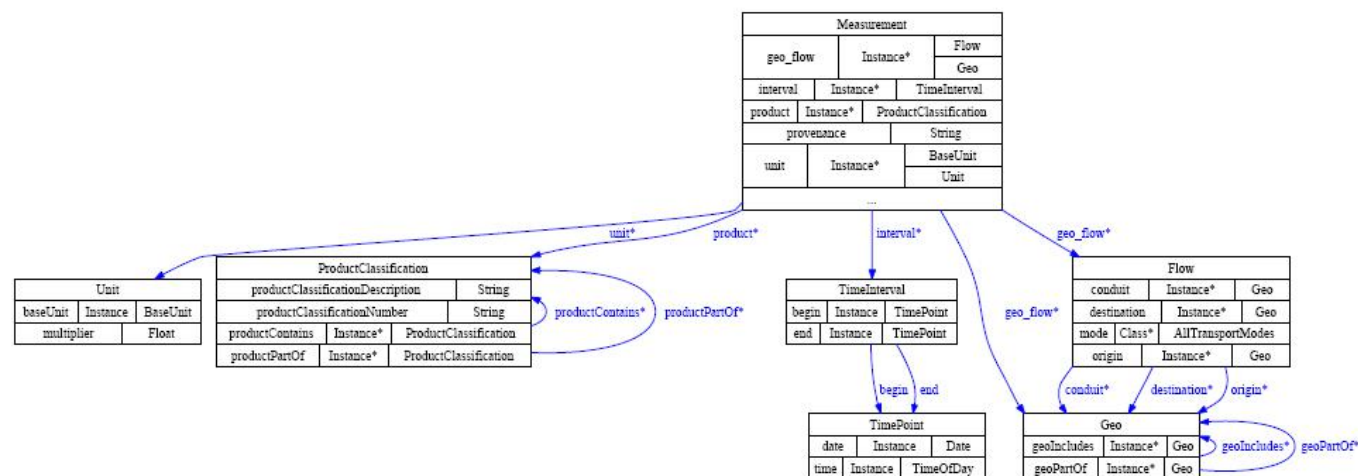
10 YEAR SUMMARY OF AIR FREIGHT	
YEAR	AIR FREIGHT IN TONS
1994	1,516,567
1995	1,567,248
1996	1,696,663
1997	1,852,487
1998	1,787,400
1999	1,884,526
2000	2,002,614
2001	1,779,065
2002	1,869,932

The browser's taskbar at the bottom shows the Internet Explorer icon, the word 'Internet', and a zoom level of 100%.

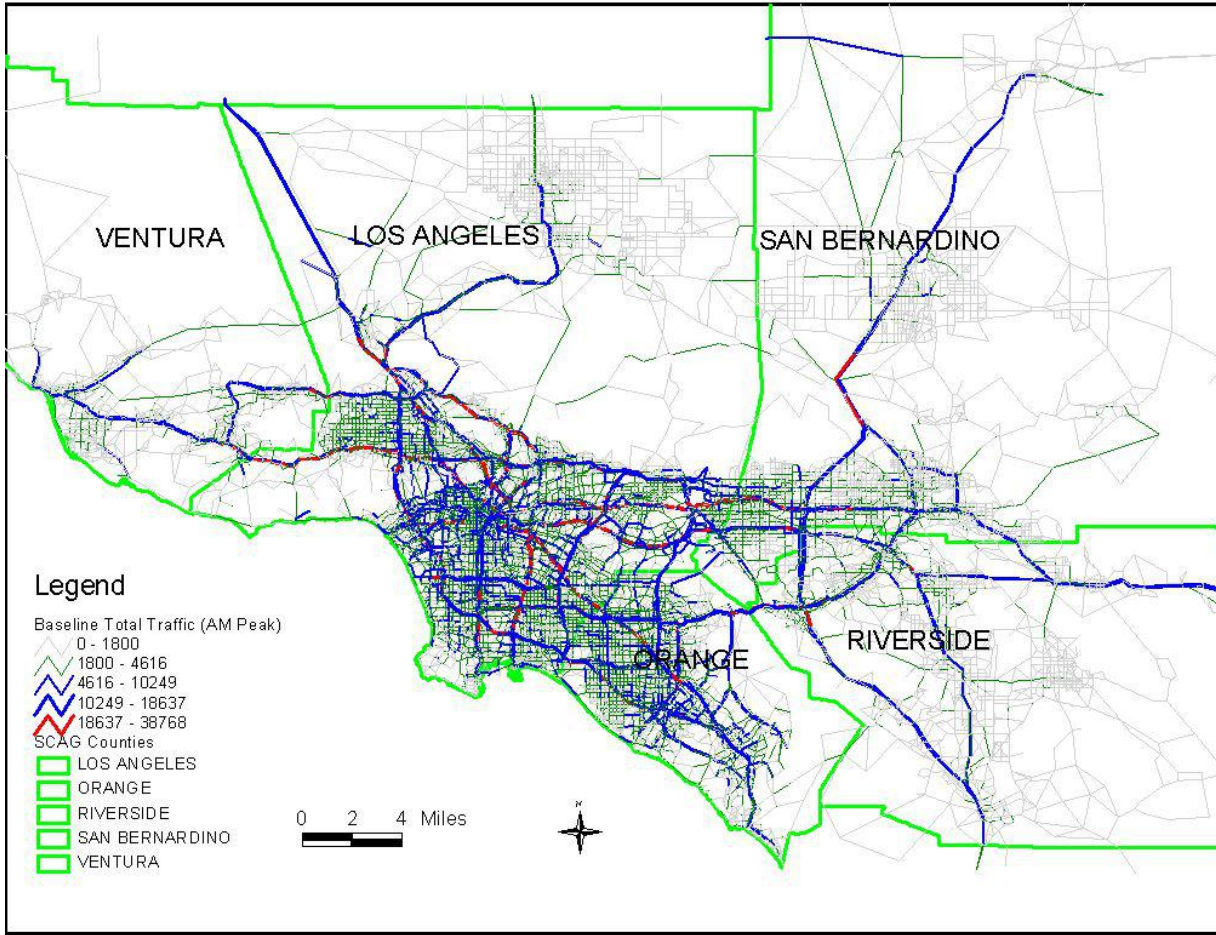
## Freight data platform (货运数据平台)



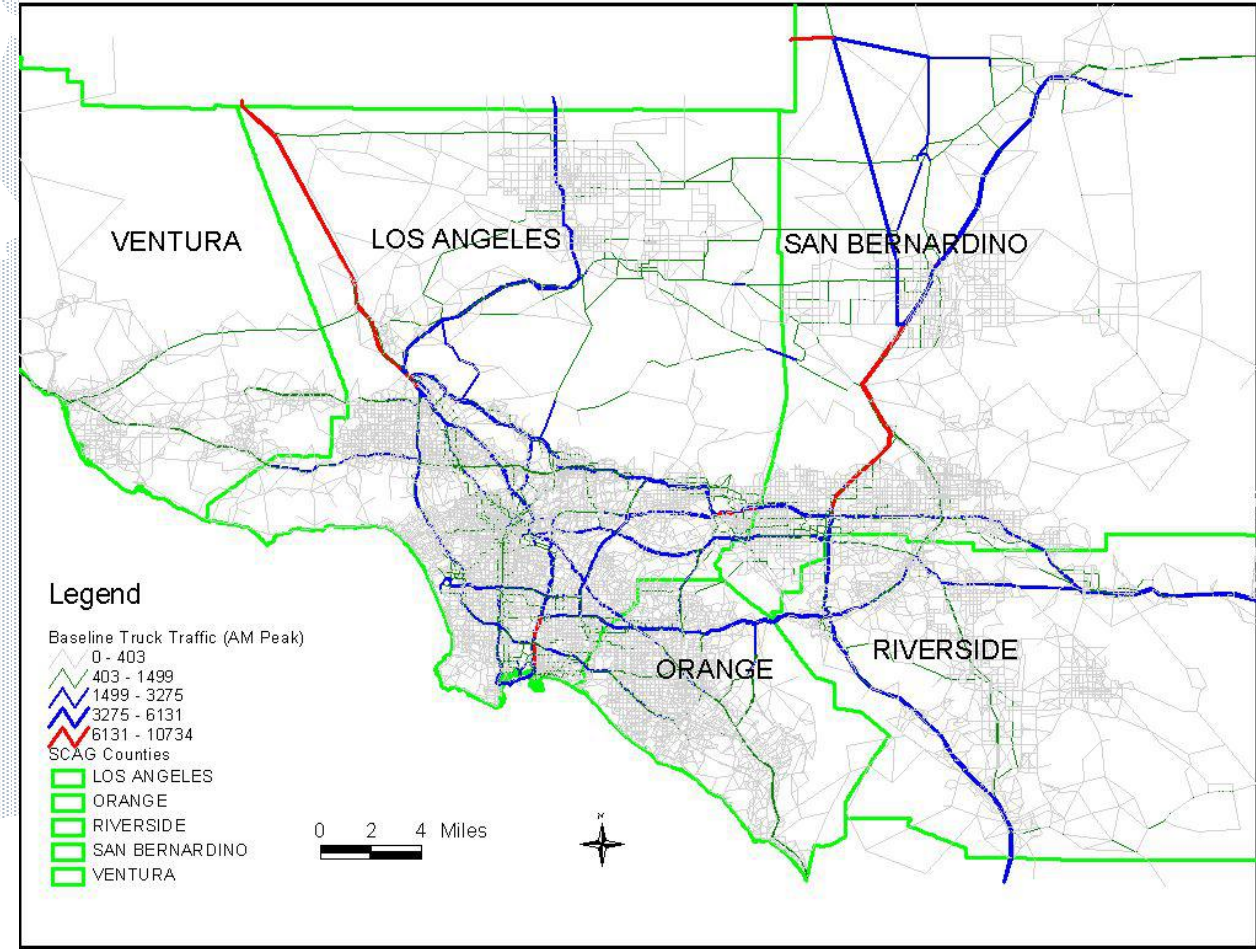
## Freight data structure (货运数据结构)



Newly Assigned Total Traffic Volume (Passenger + Freight) in the Five-County LA Region (更新的南加州客运与货运总量)

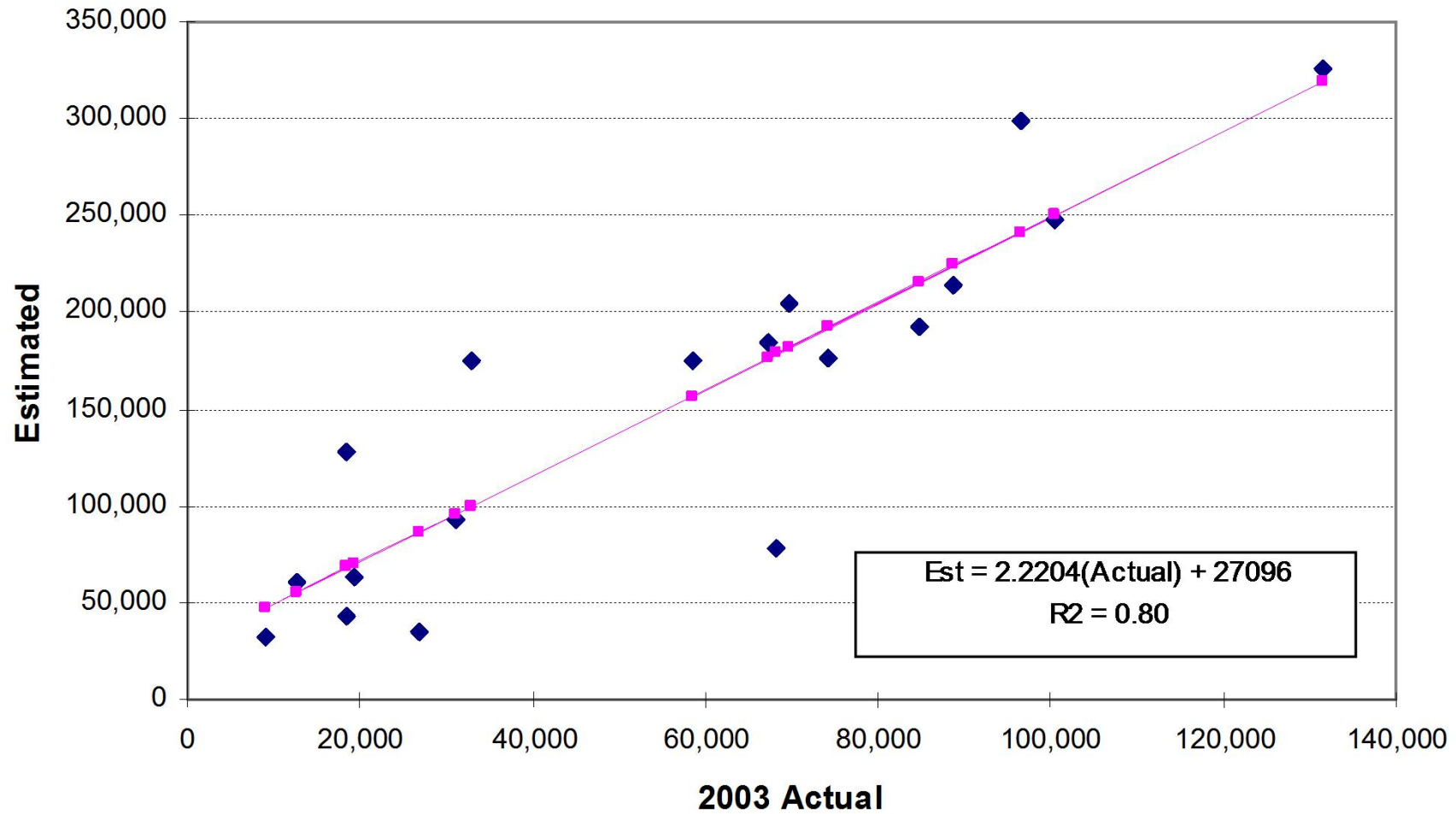


Newly Assigned Freight Volume in the Five-County LA Region (更新的南加州货运总量)





# Estimated and Actual Screenline HDT, 24 hrs, in PCEs (模型估计与实际的货运量的回归分析)



# 当前的研究

智能可视化模型

从BIM到CIM（建筑-城市信息模型）

从CIM到RIM（城市-区域信息模型）

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## 智能可视化模型的研究

- 城市系统模型
- 智慧城市规划设计
- 多规合一平台



认知城市  
Cognitive City

智慧城市时空  
大数据团队

创意城市  
Creative City

连接城市  
Connected City

## C1、基于CIM（城市信息模型）的规划/设计

CityGo CIM 城市  
智能模型及数据  
结构

CityBlock 大数据  
模型及关键技术

面向CityGo的深  
度学习系统和核  
心算法

基于CityGo的智  
慧小镇应用与示  
范

BIM(S)

Building Information Modeling

+

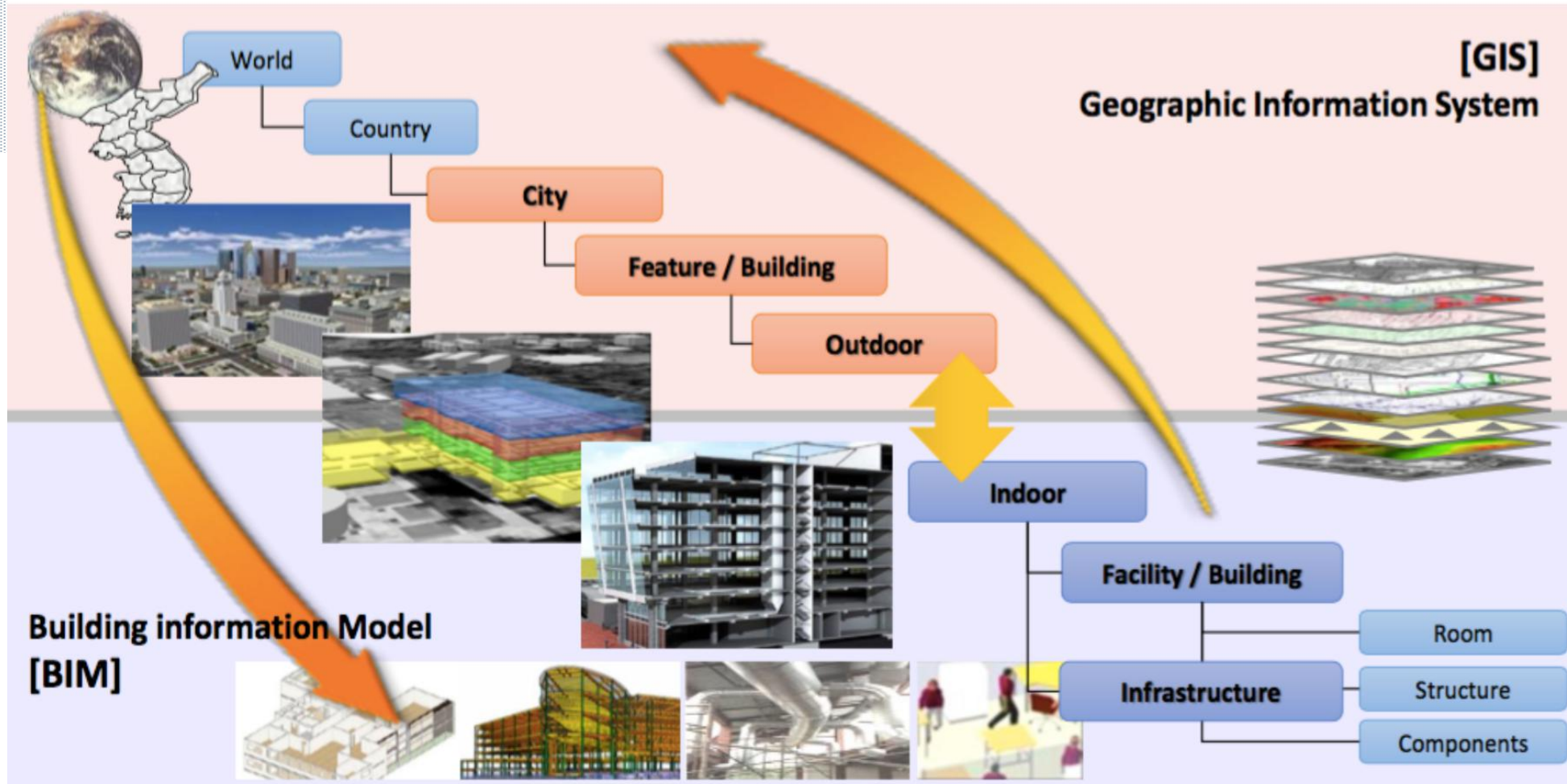
3D GIS

3D Geographic Information System

=

CIM

City Information Modeling



BIM

+

3D GIS

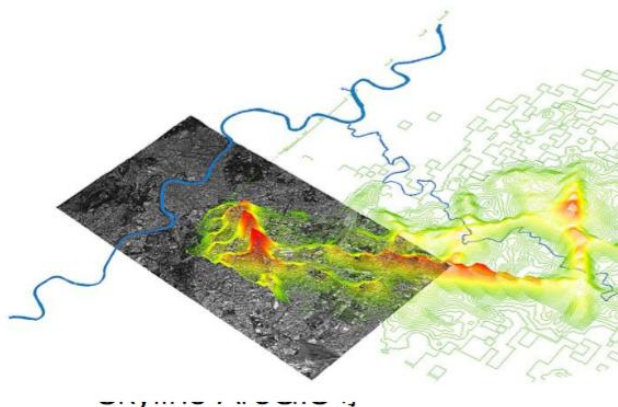
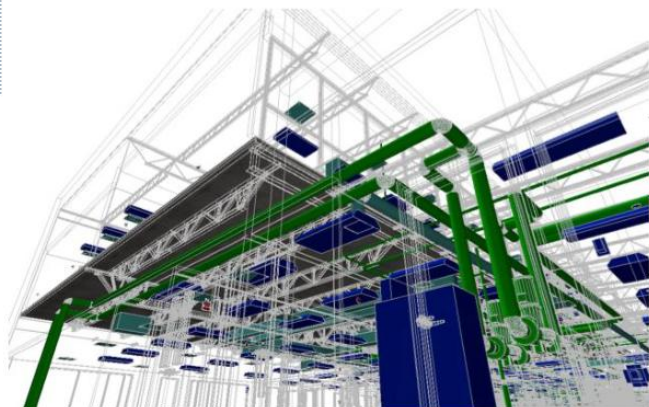
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CIM

Building Information Modeling

3D Geographic Information System

City Information Modeling



← 语义分析映射

← 数据格式转换

← 坐标体系转换

← 模型结构调整

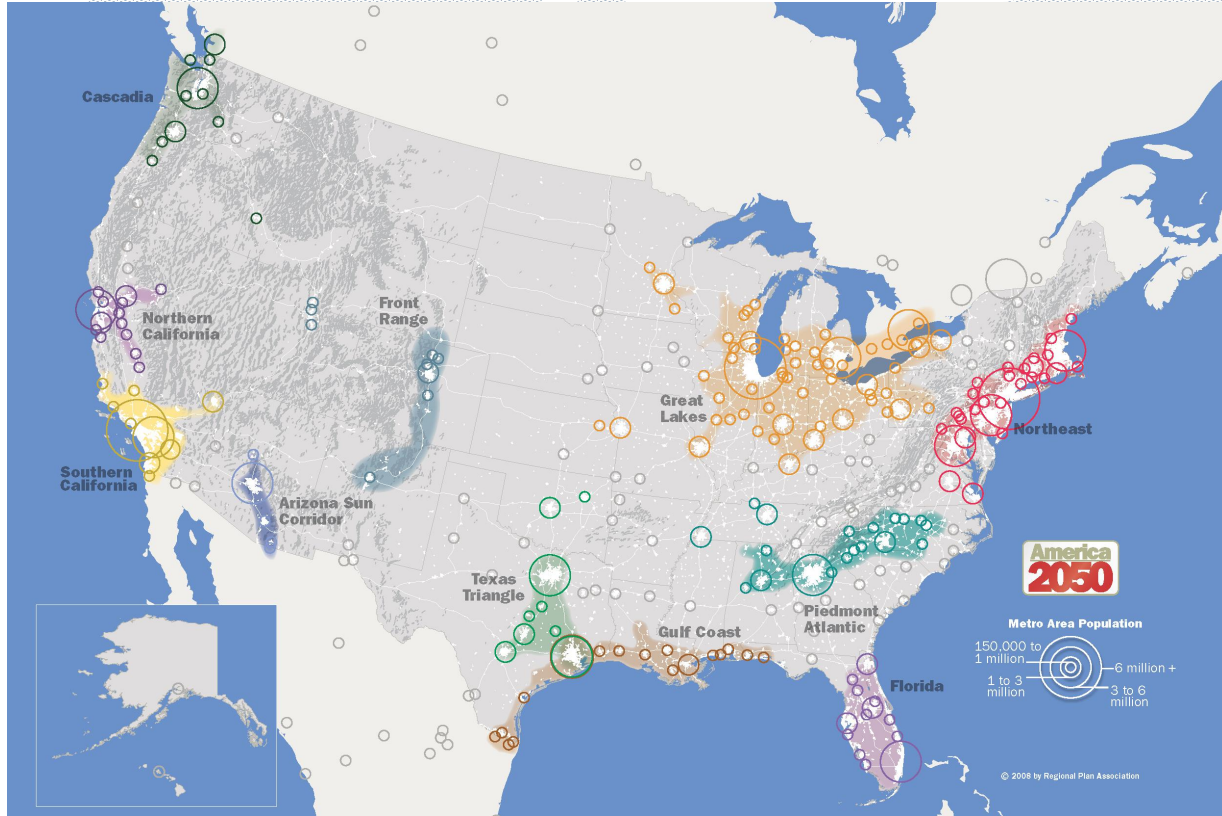
应用层级集成

BIM

CIM



# Emerging Megaregions in US and China Call for RIMs (中美城市群的发展需要区域信息模型)



# 展望

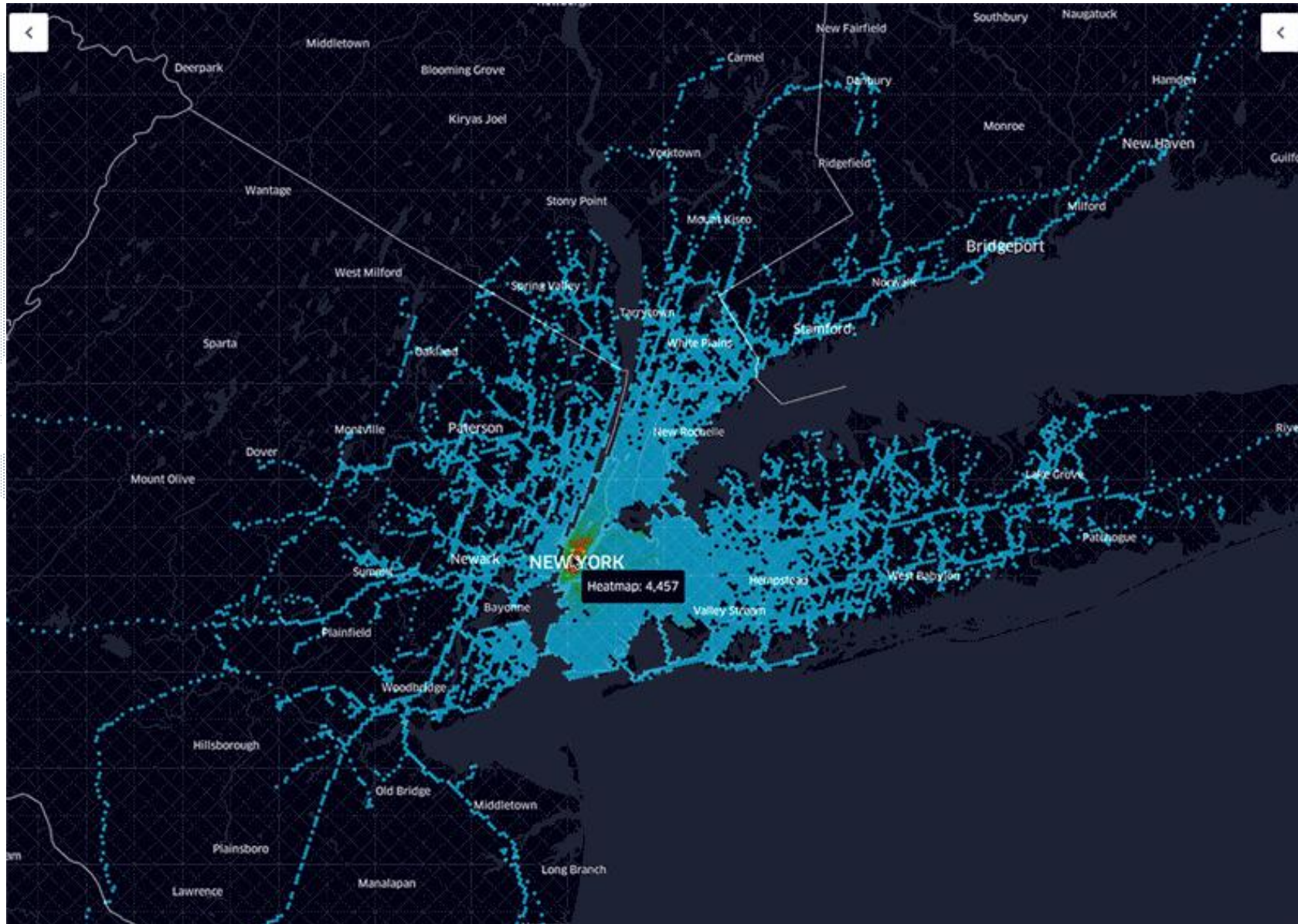
CIM/RIM模型与AI（人工智能）的结合

CIM/RIM模型与大数据的结合

智能CIM/RIM模型的应用

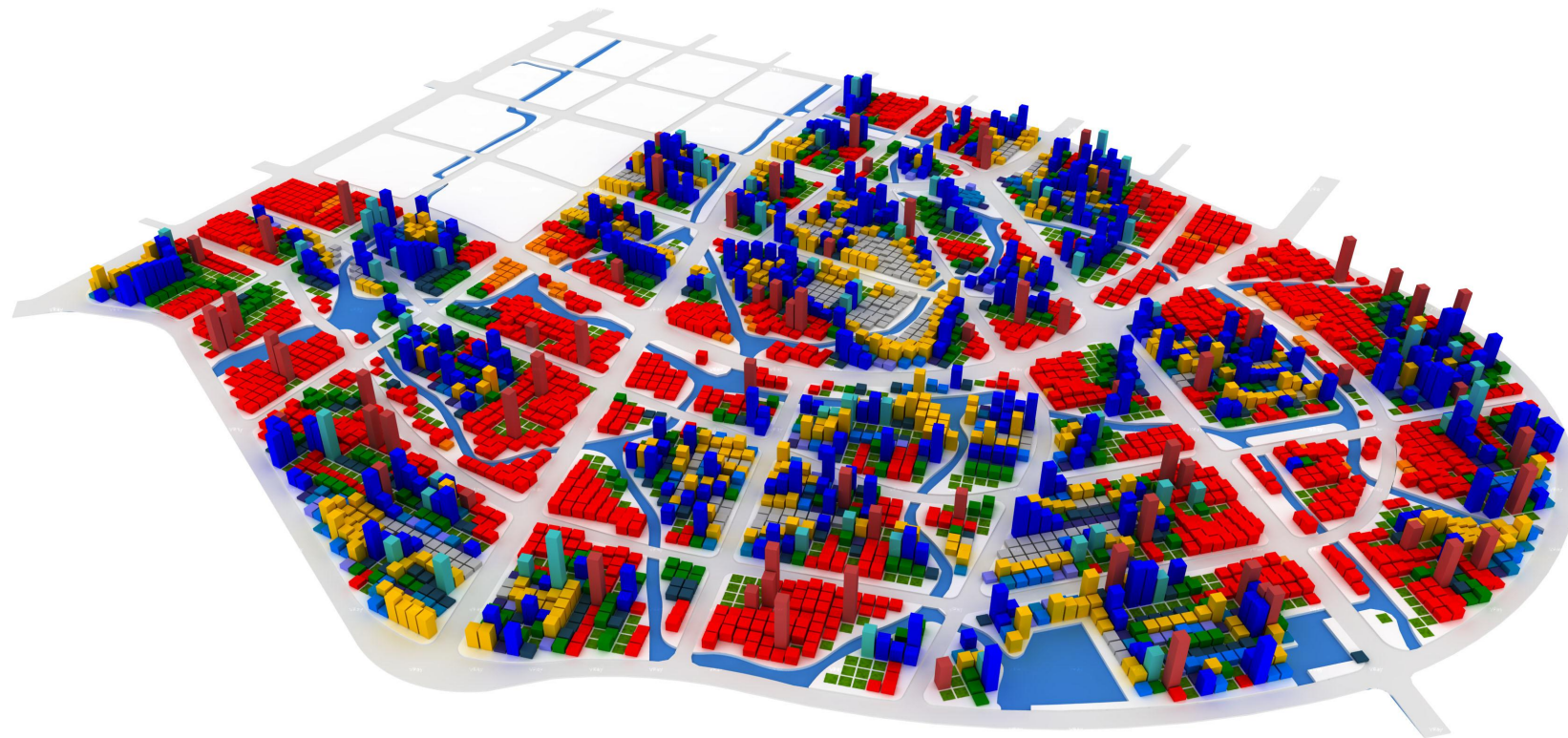








便于城市开发者，管理者和规划师操作的可视化平台概念，可以同时调整功能业态比例，城市路网，街区体块和容积率等参数



在总体规划的容积率给定的条件下，城市规划的土地利用性质与功能业态按照城市路网及交通可达性程序自主涌现出来的城市信息模型

# 目标：为智慧城市（特色小镇）应用生态提供产品和技术



# 面向对象的特色小镇操作系统 & 智能硬件



# 问题与建议?



Contact: [pan\\_qs@tsu.edu](mailto:pan_qs@tsu.edu)