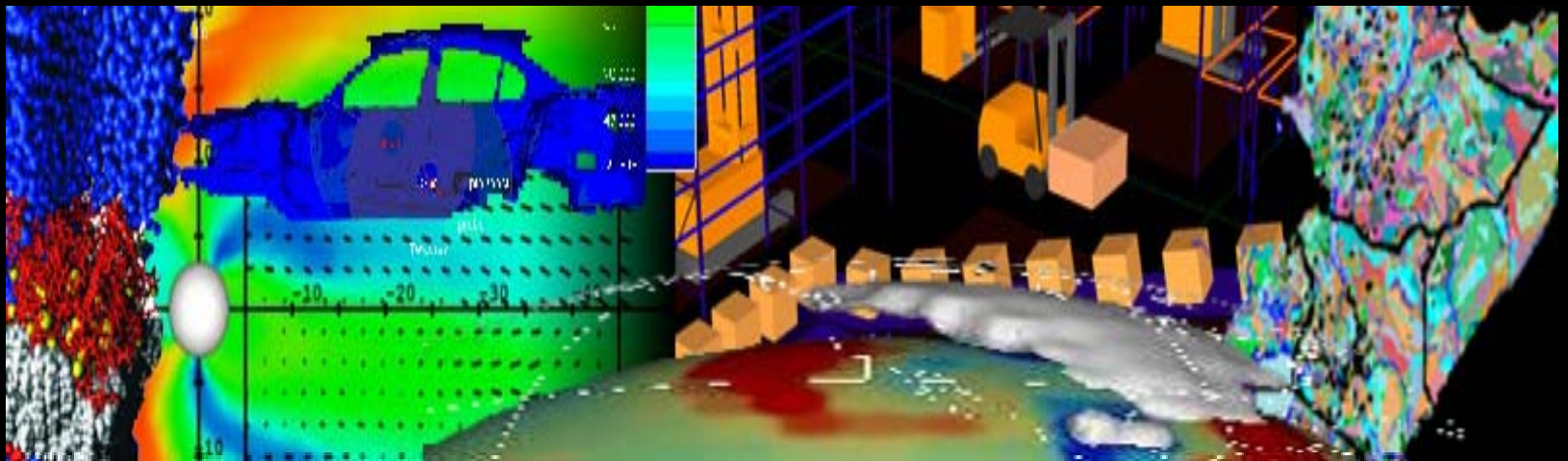
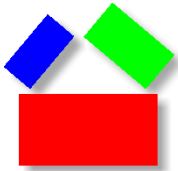


Global Supply Chain Management and the Chinese Megalopolis

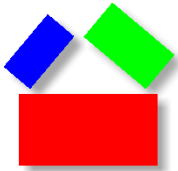


Edmund W. Schuster
Laboratory for Manufacturing and Productivity
Massachusetts Institute of Technology

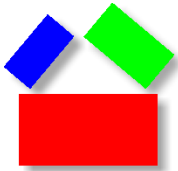


AGENDA

- I. My Research at MIT
- II. Definition of Supply Chain – physical infrastructure
- III. The M Language - data flows and information technology infrastructure
- IV. Conclusion: The Chinese Megalopolis – steps forward



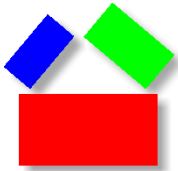
I. My Research at MIT



MY RESEARCH BACKGROUND

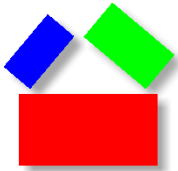
- **Management Science, Operations Research and Marketing Science**
 - applying mathematics to real-world problems
- **Supply Chain Management**
 - application of statistics and modeling for decision-making
- **Manufacturing Systems**
 - production planning and scheduling
- **Process Manufacturing**
 - food and agricultural products, cooperatives, agribusiness
- **Information Technology and Infrastructure**
 - semantic technologies, data formats and exchange, integration
- **THE CONCORD GRAPE**





MY RESEARCH INITIATIVES AT MIT

- **The Chinese Megalopolis (administration and supply chain)**
 - a new effort at MIT initiated by Muzhi Zhou, Visiting Professor
 - goal - create a multi-disciplinary groups within MIT
 - contribute to the research for infrastructure and technological components of the Asia Megalopolis
- **Agricultural Systems Productivity (admin. and research)**
 - apply new sensing, data, modeling, and spatial technologies
 - transform agriculture into a data-driven activity using new information technologies
 - greater supply chain integration
- **The Data Center Program (admin. and research)**
 - the *M Language*; data and mathematical model integration
- **RFID (applied research)**
 - Supply chain applications including track and trace



WEB SITES CONTAINING PUBLISHED RESEARCH

MIT – Main Entry

mit.edu

The MIT Data Center Program

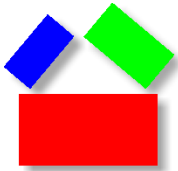
datacenter.mit.edu

Laboratory for Manufacturing and Productivity

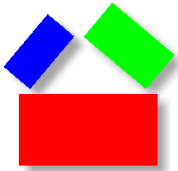
<http://web.mit.edu/lmp/>

My Personal Web Site

www.ed-w.info

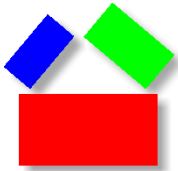


II. Definition of Supply Chain

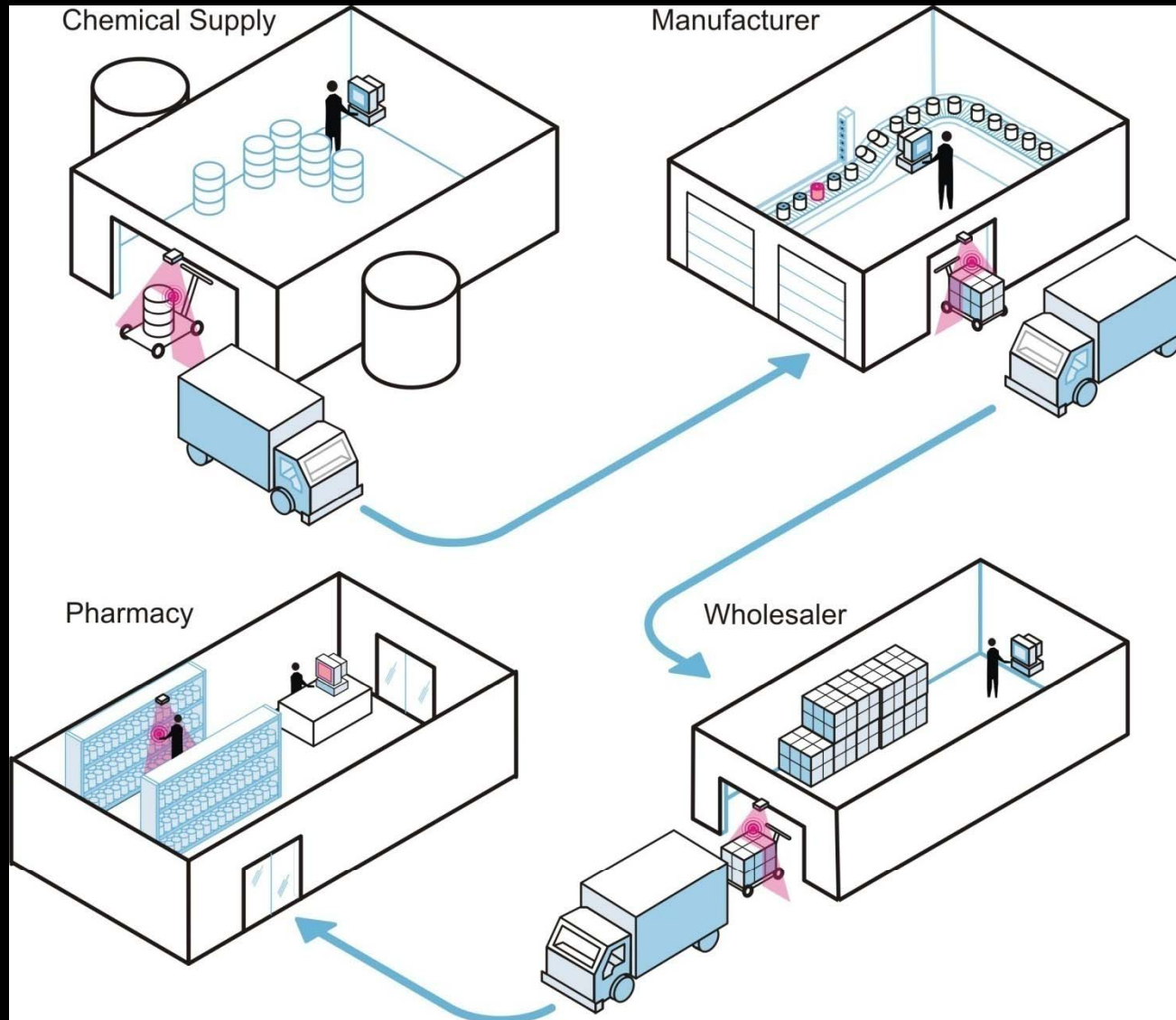


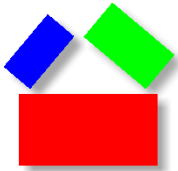
SUPPLY CHAIN MANAGEMENT

To create a competitive advantage through purchasing, manufacturing, and distributing products and services, which provide superior value to our customers



THE SUPPLY CHAIN – PHARMACEUTICAL MFG.

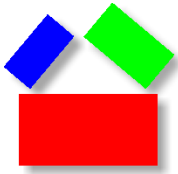




The Impact of e-Commerce on the Japanese Raw Fish Supply Chain (Schuster and Watanabe)

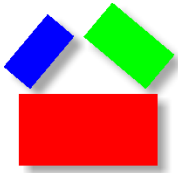
- **Purpose** – conduct primary research to determine the state of e-Commerce in Japan
- **Expectation** – observation of a group of innovative companies attempting to revolutionize the complex Japanese distribution system
- **Method** – examination of the fresh fish supply chain, interviews conducted in Japanese
- **Result** – observed structural issues leading to unanticipated lack of e-Commerce penetration in the Japanese market



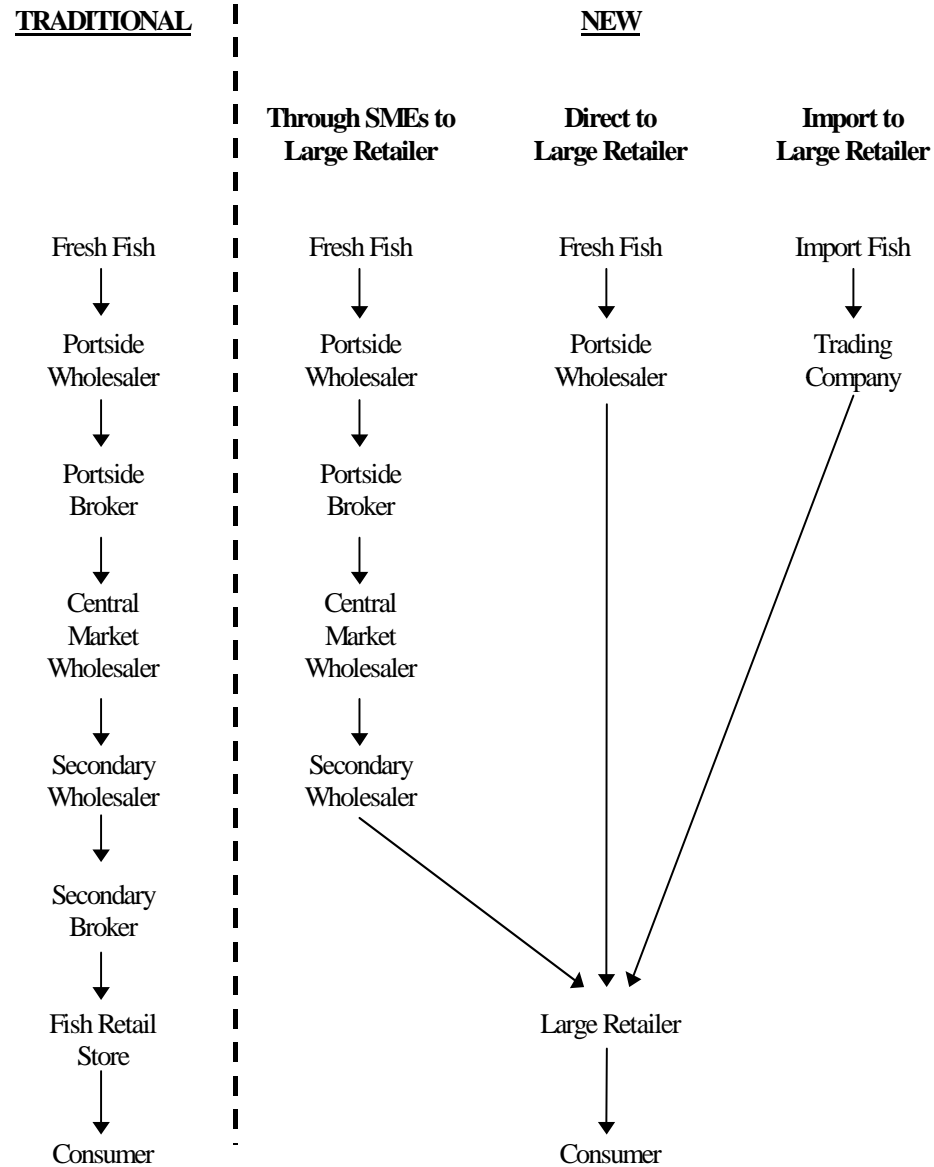


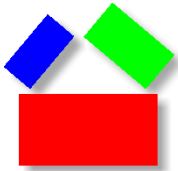
Complexity of Distribution System: Comparison Between the United States and Japan

	Japan	United States
Number of retail establishments (in thousands)	1,407	1,526
Number of retail establishments per 10,000 population	111	54
Number of wholesale establishments (in thousands)	426	495
Number of wholesalers per 10,000 population	34	17
W/R	1	2



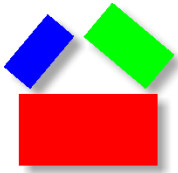
Traditional Channel for Small Retailers and New Channels for Large Retailers (fresh tuna)



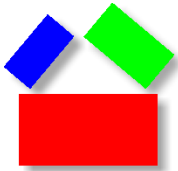


IMPLICATIONS FOR THE MEGALOPOLIS

- An optimal supply chain will **reduce energy requirements**, specifically demand for petroleum
- **Space planning** will improve, better **utilization** of land
 - example: optimal number of square meters devoted to retailing and warehousing
 - *Predicting Real Estate Prices Using Travel Budgets and Urban Spatial Diffusion* , Dr. Stanley B Gershwin, MIT
- Improved flow of consumer goods to the people of China
 - less waste, fewer cases of obsolescence, better customer service
 - establishing a modern consumer market
 - improved product safety
- Reduce Global Warming and Pollution

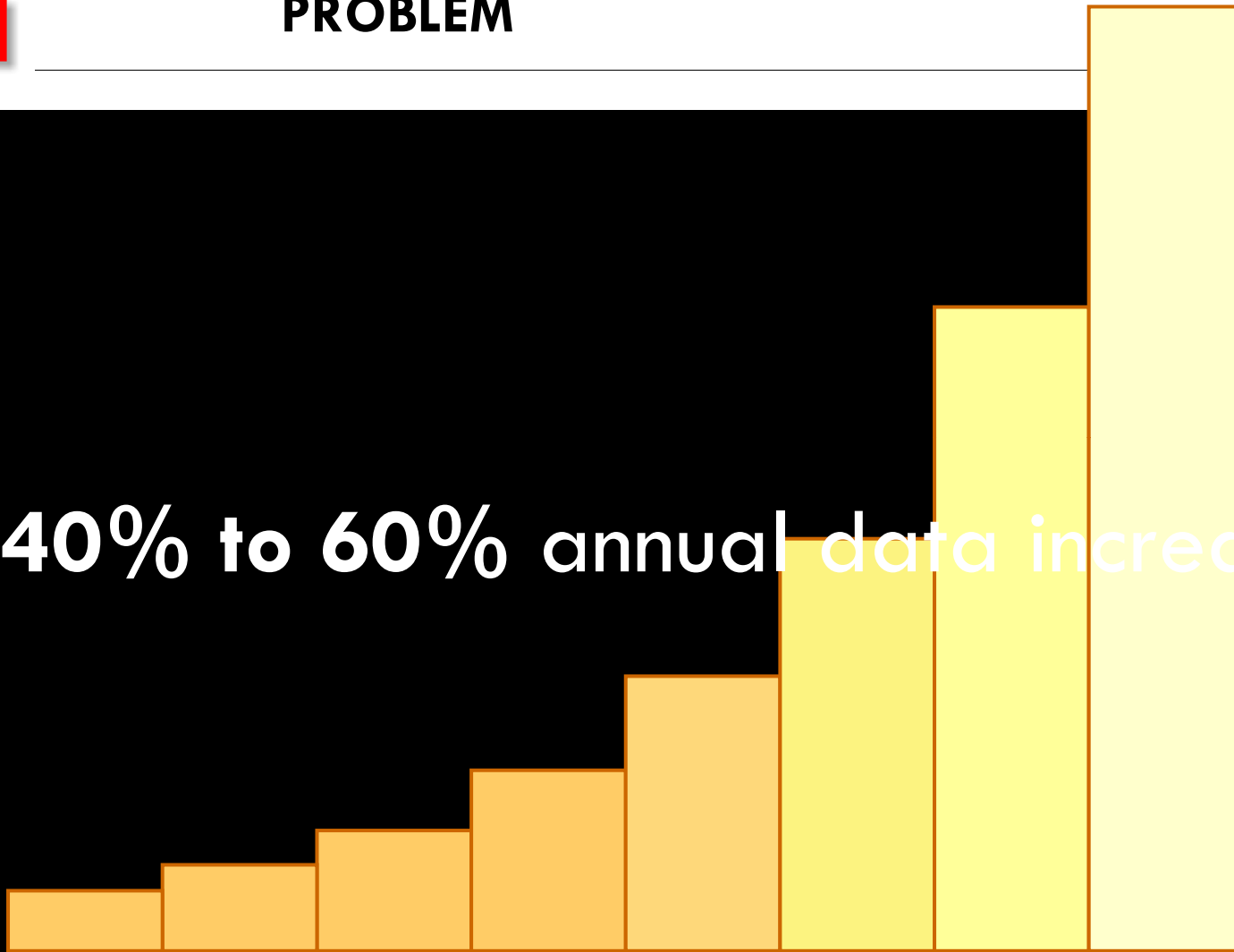


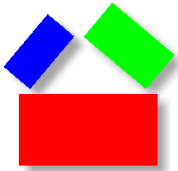
III. The M Language



PROBLEM

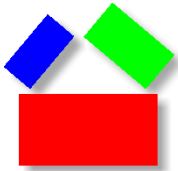
40% to 60% annual data increase





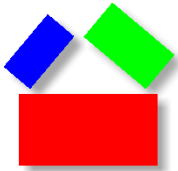
For 2004, shipments of storage devices equaled **four times** the space needed to store every word ever spoken during the entire course of human history.

Lyons, Daniel (2004), "Too Much Data," *Forbes*, December 13.

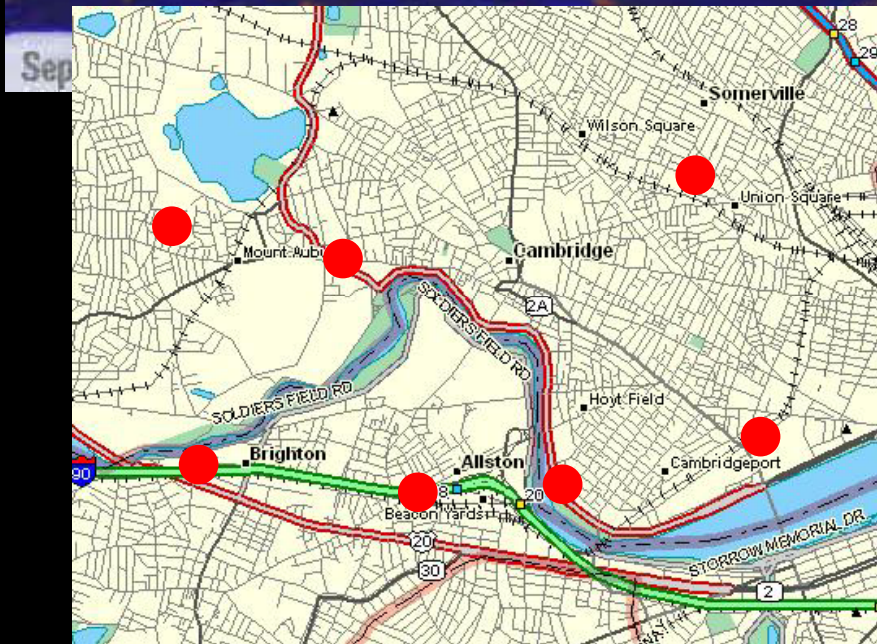
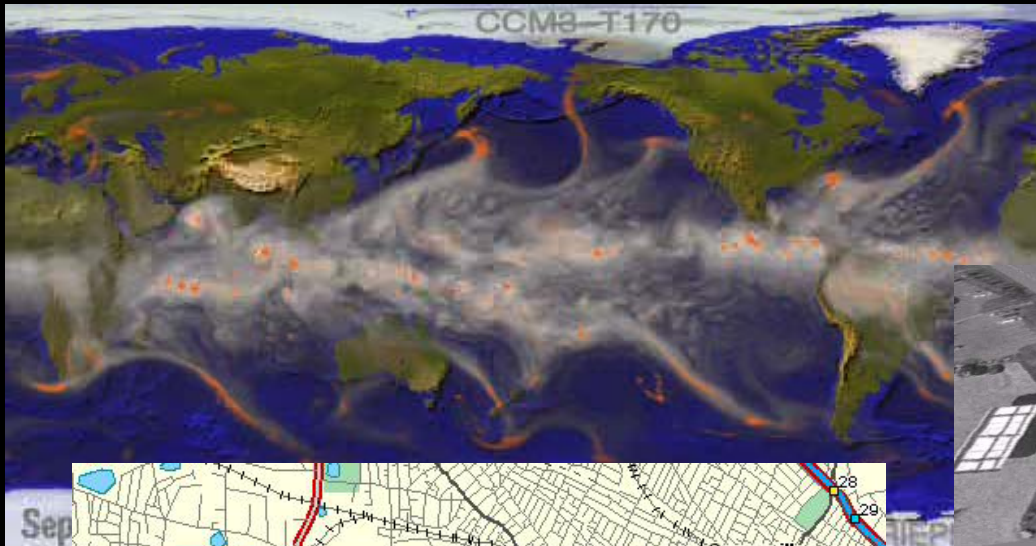


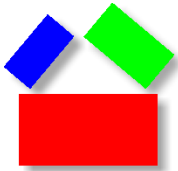
PROBLEM

What are you going to do
with all of your
Data?

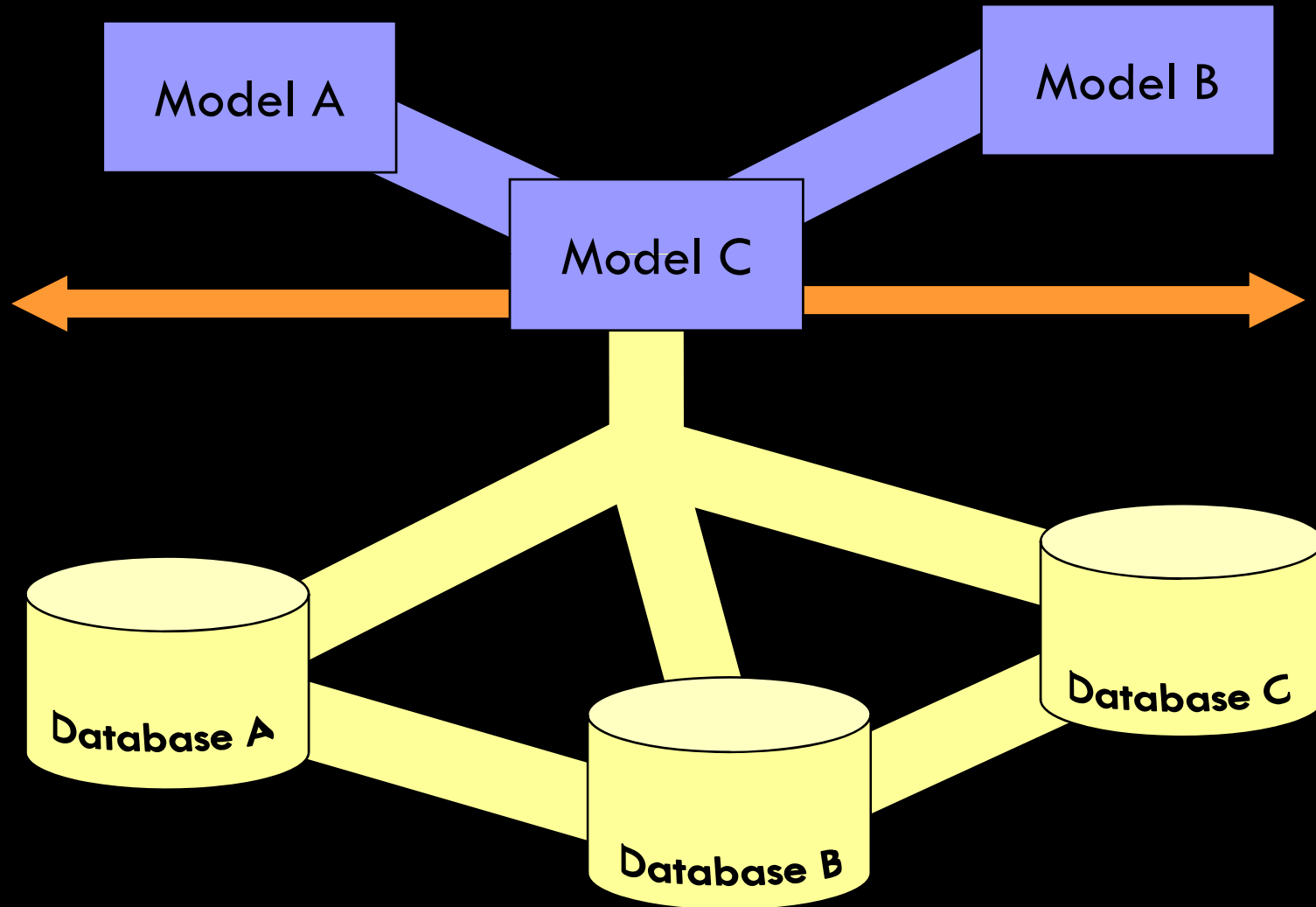


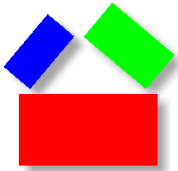
EXAMPLE – CITY OPERATION



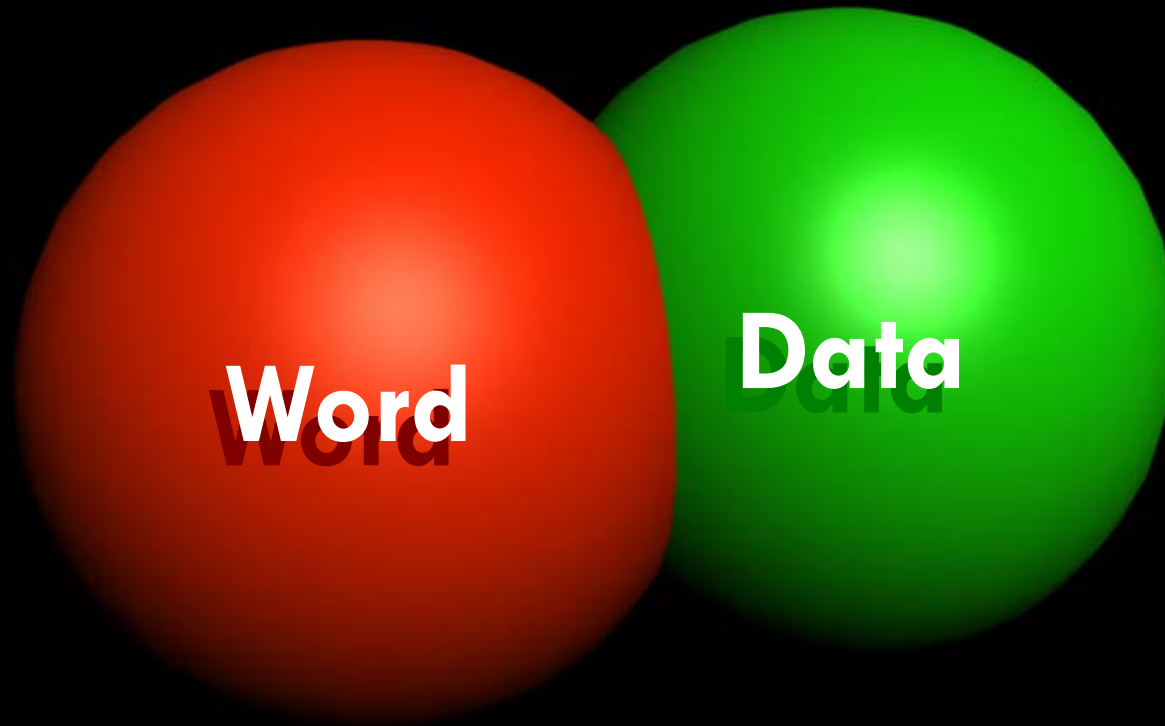


VISION

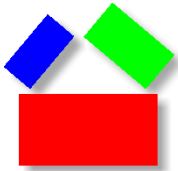




DATA "ATOM"



Data that "self identifies"

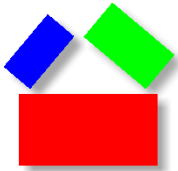


M – THE BIG PICTURE (GENERAL)

- A Network of Models
 - Capture 50 years of modeling
 - Something like eBay
 - The future of ERP...Packaged Software?
 - SAP and DEC, **Analog Devices**
- Connect to the customer, interact
- Interoperable Data
 - Something like Adobe Acrobat
- Sensors

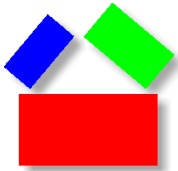
“the number of deployed sensors will dwarf the number of personal computers by a thousand fold in 2010”

Ferguson, Glover, Sanjay Mathur and Baiju Shah (2005), “Evolving From Information to Insight,” *Sloan Management Review* 46:2, p. 52.



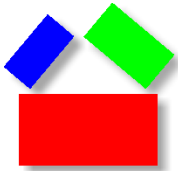
M – THE BIG PICTURE (COMPUTER SCIENCE)

- An open system
- M works with existing data
- The language is designed to be used with existing standards, including the W3C
- Achieve communication when target is un-known
- Address the “many-to-many” problem
- A way to deal with semantics that is different from previous Artificial Intelligence approaches



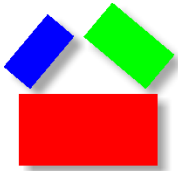
SEVERAL TYPES OF WEBS

- The Web of Information
 - HTML and the World Wide Web
- The Web of Things
 - Linking physical objects together using the EPCGlobal Network and RFID
- The Web of Abstractions
 - Building a network of mathematical models
 - Link models together
 - Link data to models
 - Computer languages & protocols to create a free flow of models in a network (Internet or Intranet)



RFID TAG





MY BOOK

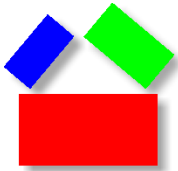
EDMUND W. SCHUSTER
STUART J. ALLEN
DAVID L. BROCK

Global RFID

The Value of the EPCglobal Network™
for Supply Chain Management

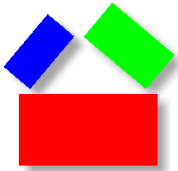


 Springer

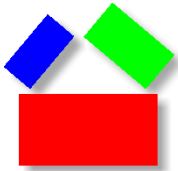


IMPLICATIONS FOR THE MEGALOPOLIS

- Data will drive the city of the future
 - Better space planning, modeling of diffusion
 - Control of traffic, Intelligent Transportation Systems
- Rapid economic growth will accelerate the need for improved information technology infrastructure



IV. Conclusion: The Chinese Megalopolis

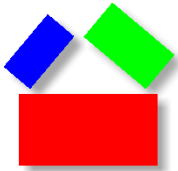


REASONS FOR GLOBALIZATION

- During the past 50 years costs have decreased:
 - transatlantic phone calls now cost 90% less
 - ocean freight is 50% cheaper
 - air travel is 80% less expensive

The New Geography: How the Digital Revolution is Changing the American Landscape (Joel Kotkin, Random House, 2000)

- Strategic Thinking, “The Big Picture”
 - Global markets and networking become very important
- Innovation and implementation



MIT INVOLVEMENT WITH MEGALOPOLIS

- Many professors and researchers at MIT are interested in the idea of the Megalopolis
- Study of a city is a multi-disciplinary subject, something that MIT specializes.
- We are interested in integrating with the team to produce a comprehensive report on megalopolis policy and technology. This is a long-term project.
- We are interested in knowing the research areas of greatest benefit
- If you are in the United States, you are always welcome to visit MIT in Cambridge, MA

