



Manufacturing Systems and Information Technology

Integrating technology in the real world

David Brock

Director, MIT Data Center

Principal Research Scientist

Laboratory for Manufacturing and Productivity

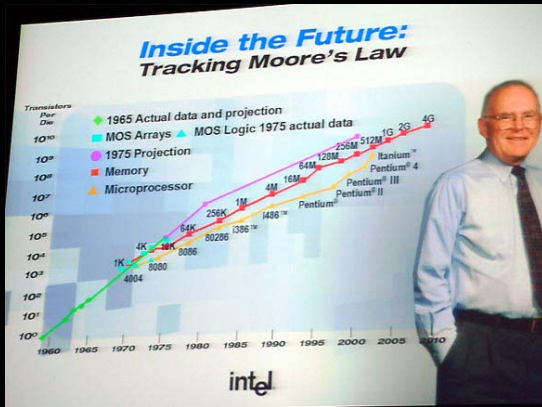


HISTORY





CHANGES



U.S. Census Bureau
AMERICAN COMMUNITY SURVEY

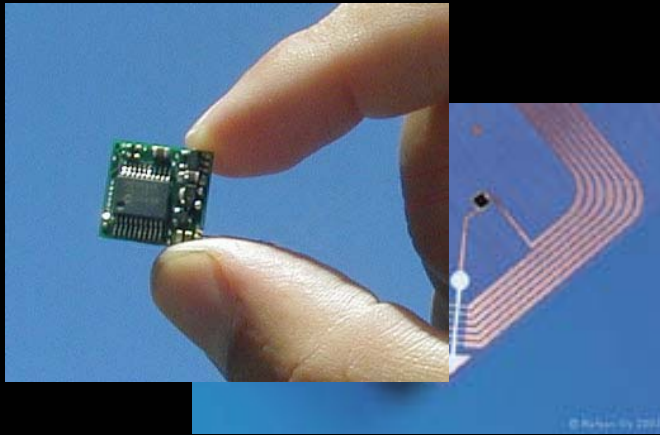
DATA TABLES RANKING TABLES PUBLIC

Low Temperature(F) Ending Tue Jul 06 2004 8AM EDT
(Tue Jul 06 2004 12Z)

National Digital Forecast Database
Experimental graphic created 07/05/2004 11:36PM EDT

Available in this Section

- Data Tables Main
- 2002 Data Profiles
- 2001-2002 Change Profiles
- 2002-2003 Change Profiles
- Special Tabulations
- ED, BDM Order/Details
- Detailed Tables
- 2001 Data Profiles
- 2000-2001 Change Profiles
- 2000 Data Profiles
- 1999 Data Profiles



XML HTML
TCP/IP EPC
HTTP
SOAP



CHANGES





Integrating technology in the real world



build



distribute



use



prepare



recycle

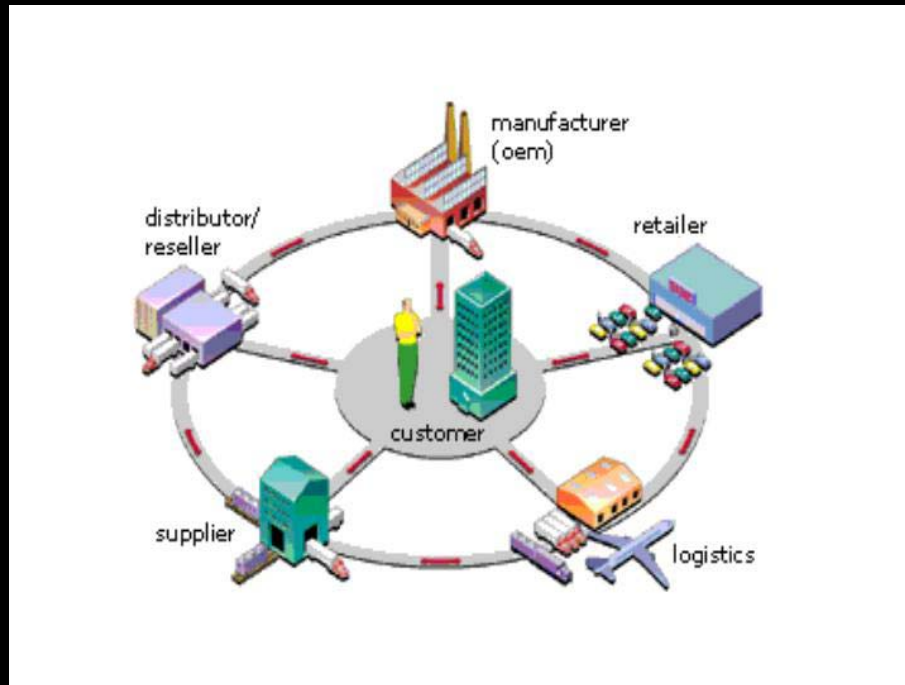


LMP

Laboratory for Manufacturing and Productivity



Operations Research in Manufacturing Systems



Stan Gershwin
Laboratory for Manufacturing and Productivity
Massachusetts Institute of Technology



Development and application of **operations research** models and methods to solve problems in **manufacturing systems, supply chains and service operations.**



- Supply chain optimization
- Strategic inventory positioning
- Tactical issues in e-retailing
- Production planning and scheduling



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Manufacturing Systems Analysis and Engineering



Stanley Gershwin
Laboratory for Manufacturing and Productivity
Massachusetts Institute of Technology



Manufacturing systems **analysis** develops methods for predicting the behavior and performance of manufacturing systems.

Manufacturing systems **engineering** uses these methods to design efficient, effective factories.



Practical theory of manufacturing *systems*

- Analysis, design, and control
- Behavior as a function of components and connections
- Components
 - Material, machines, buffers, information, material handling
- Connections
 - Topology, geometry and geography



EXAMPLES

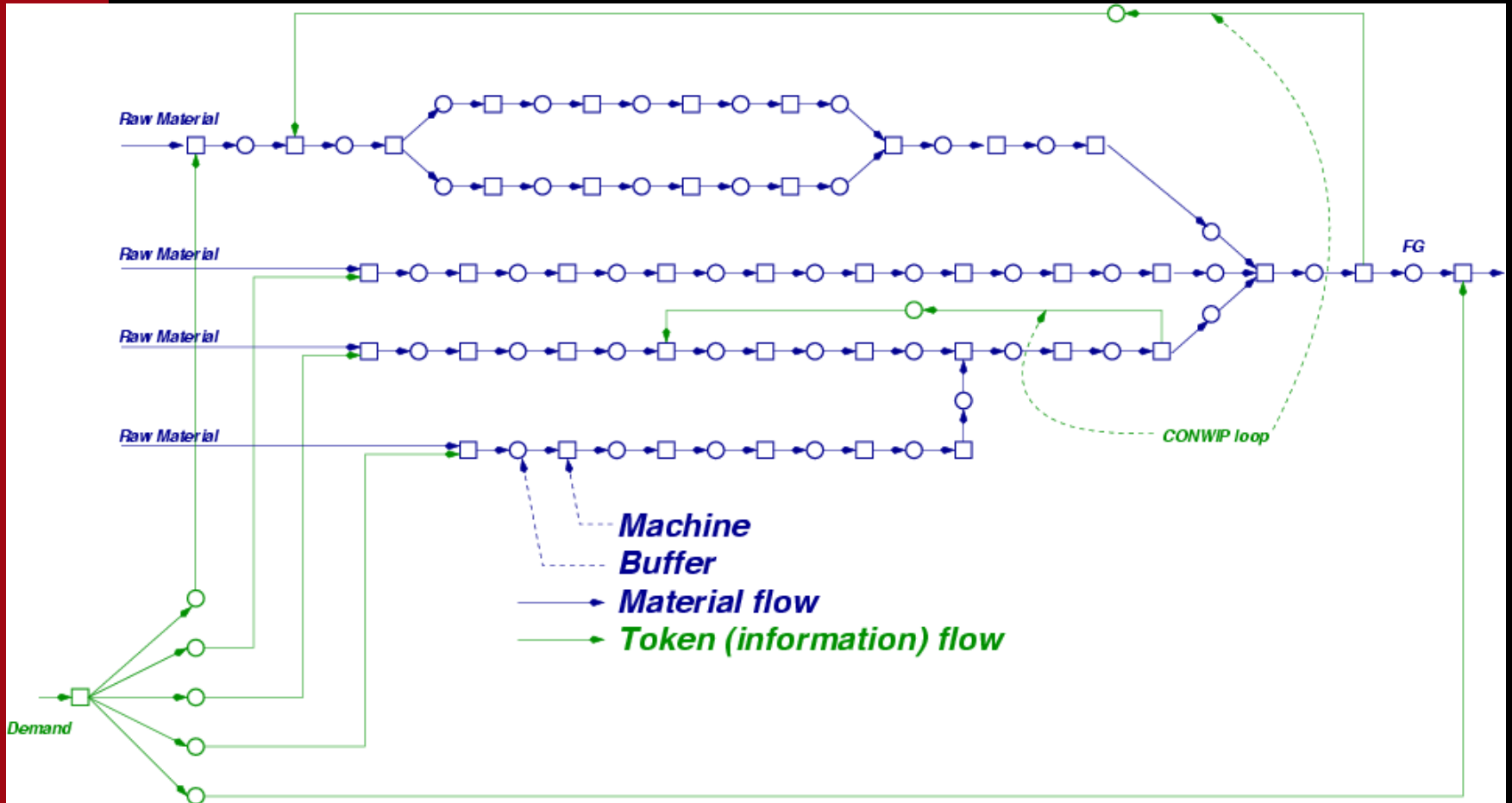
How many in-process inventory buffers are needed for a given system, where should they be located, how large should they be, and how should we manage the flow of material into and through the system?

Where should inspection stations be located, how should they be used to decide whether parts are acceptable (and if not, what should be done with them), and how should they be used to determine whether machines require repair?

Given an existing, operating production system, should it be modified when a new product is introduced; should it be totally rebuilt or replaced; or should a separate new system be built for the new product?



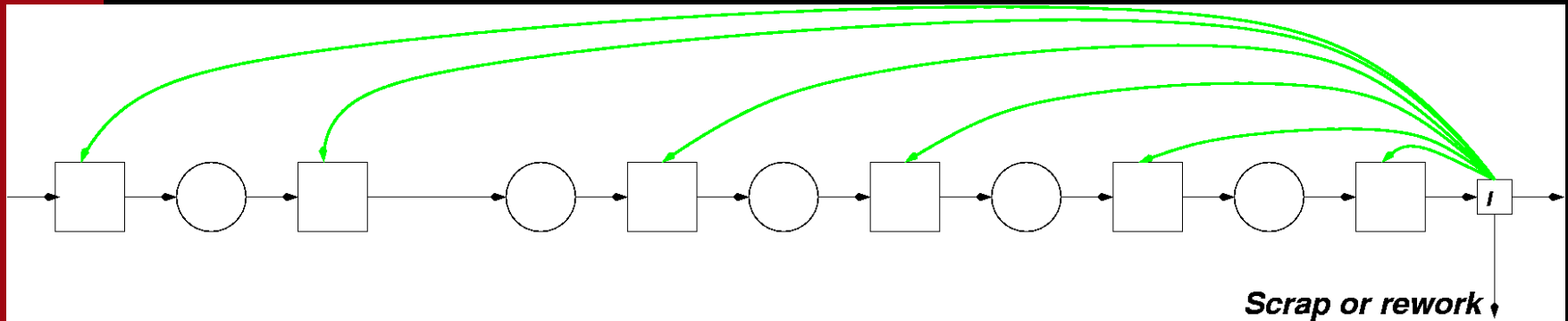
FLOW CONTROL



How to design material and information flow system for good performance at acceptable cost?



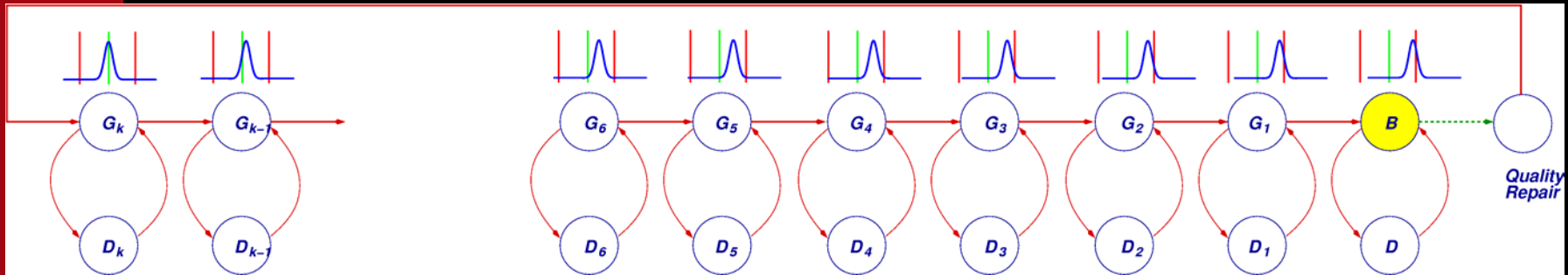
PRODUCTION LINE WITH REMOTE INSPECTION



How to design material flow system and inspection system simultaneously to provide optimal quality and quantity performance?



QUALITY DYNAMICS MODEL OF A MACHINE



How to use noisy measurements to determine when to perform maintenance?

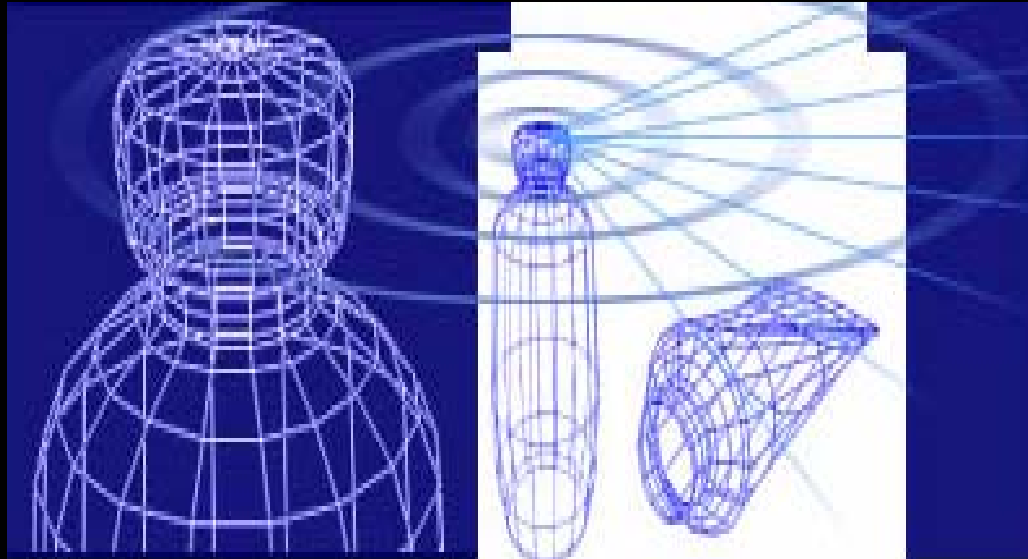


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Auto-ID Center

Networking the Physical World



Sanjay Sarma and David Brock

Co-Founders

Auto-ID Center

Massachusetts Institute of Technology



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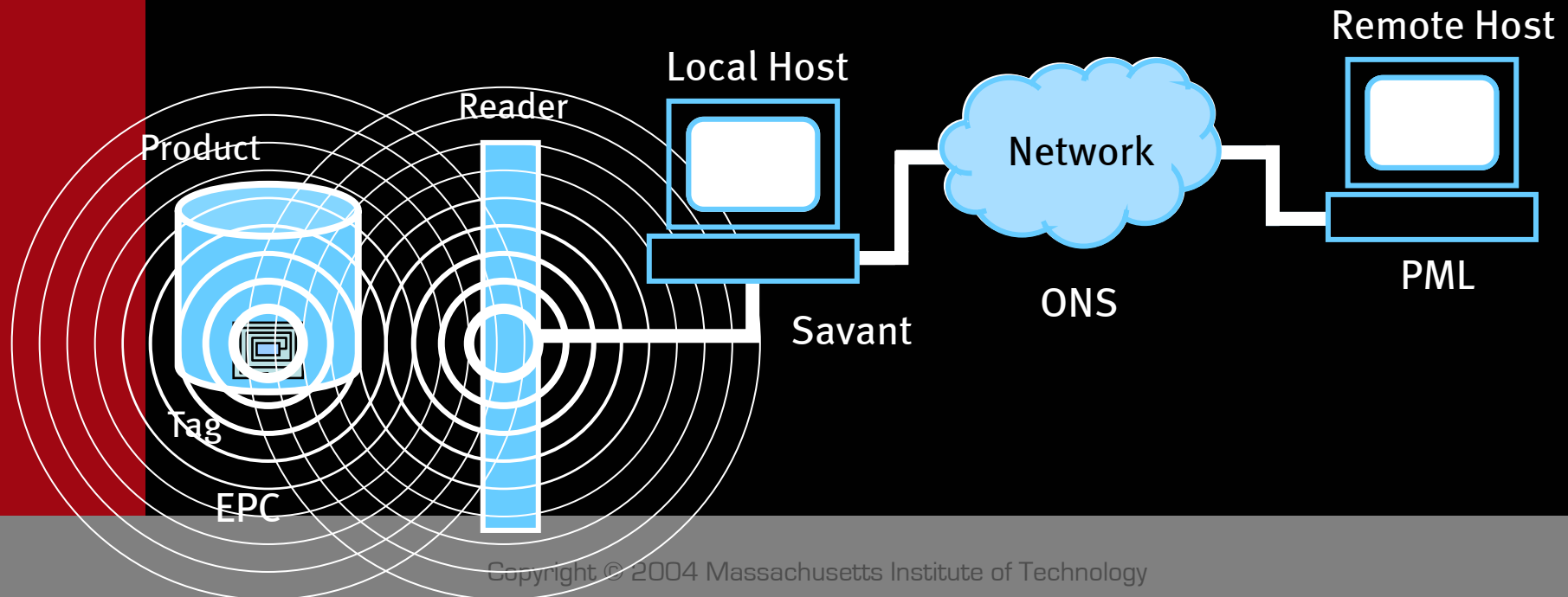
Abbott Laboratories, Ahold, Best Buy Corporation, Canon Inc., Carrerfour, Chep International, Coca-Cola, CVS, Dai Nippon Printing, Department of Defense, Ean International, Eastman Kodak, Home Depot, International Paper, Johnson & Johnson, Kellogg's, Kimberly-Clark, Kraft, Lowes Companies, Inc., Mead Westvaco, Metro, Mitsui & Co, Ltd., Nestle Purina, Pepsi Bottling Group, PepsiCo, Pfizer, Philip Morris US, Procter and Gamble Company, Sara Lee, Smurfit Stone, Target Corp., Tesco Stores Ltd., The Gillette Company, Toppan Printing, Uniform Code Council, Unilever, United States Postal Service, UPS, Visy Industries, Wal-Mart Stores Inc., Wegmans Food Markets, Inc., Yuen Foong Yu Paper Mfg. Co. LTD., Accenture, ACNielsen, ADT/Sensormatic, Alien Technology, Avery Dennison, Applied Wireless ID, Arbitron, Avery Dennison, AWID, British Telecom, Cap Gemini Ernst & Young, Cash's, Catalina Marketing Corp, Checkpoint Systems, Inc., Composite Materials PLC, ConnecTerra, Inc., Display Edge, Ember Corporation, Embrace Networks, Flexchip AG, Flint Ink, GEA Consulting, GlobeRanger, IBM. IDTechEx, Imping Inc., Information Resources, Inc., Intel, Intermec, Invensys PLC, Ishida, KSW Manhattan Associates, Markem Corp., Matrics, Microtec AG, Morningside Technologies, NCR Corporation, Nippon Telegraph and Telephone Corporation, NTT Comware, OATSystems, Omron, Philips Semiconductors, Provia Software, PSC, Rafsec, RF Saw Components, SAMSYS, SAP, Savi Technology, Sensitech, Sensormatic Electronics Corp, Siemens Dematic Corp., STMicroelectronics, Sun Microsystems, Symbol Technologies, TAGSYS, ThingMagic, Toppan Forms, Toray International, Inc., UNISYS, Vizional Technologies, Vizional, Zebra Technologies Corporation



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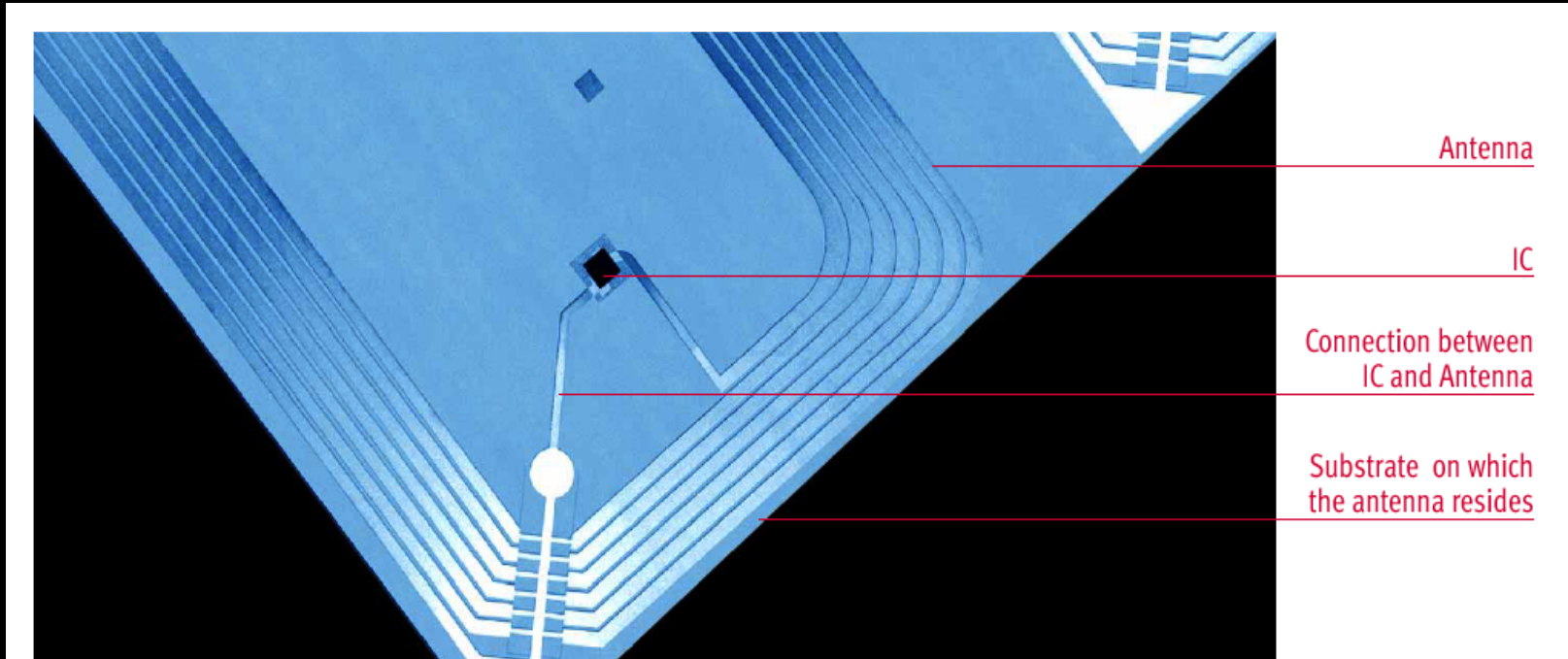


- TAGS RFID
- EPC Electronic Product Code
- ONS Object Name Service
- PML Physical Markup Language
- Savant™ Distributed Operating System



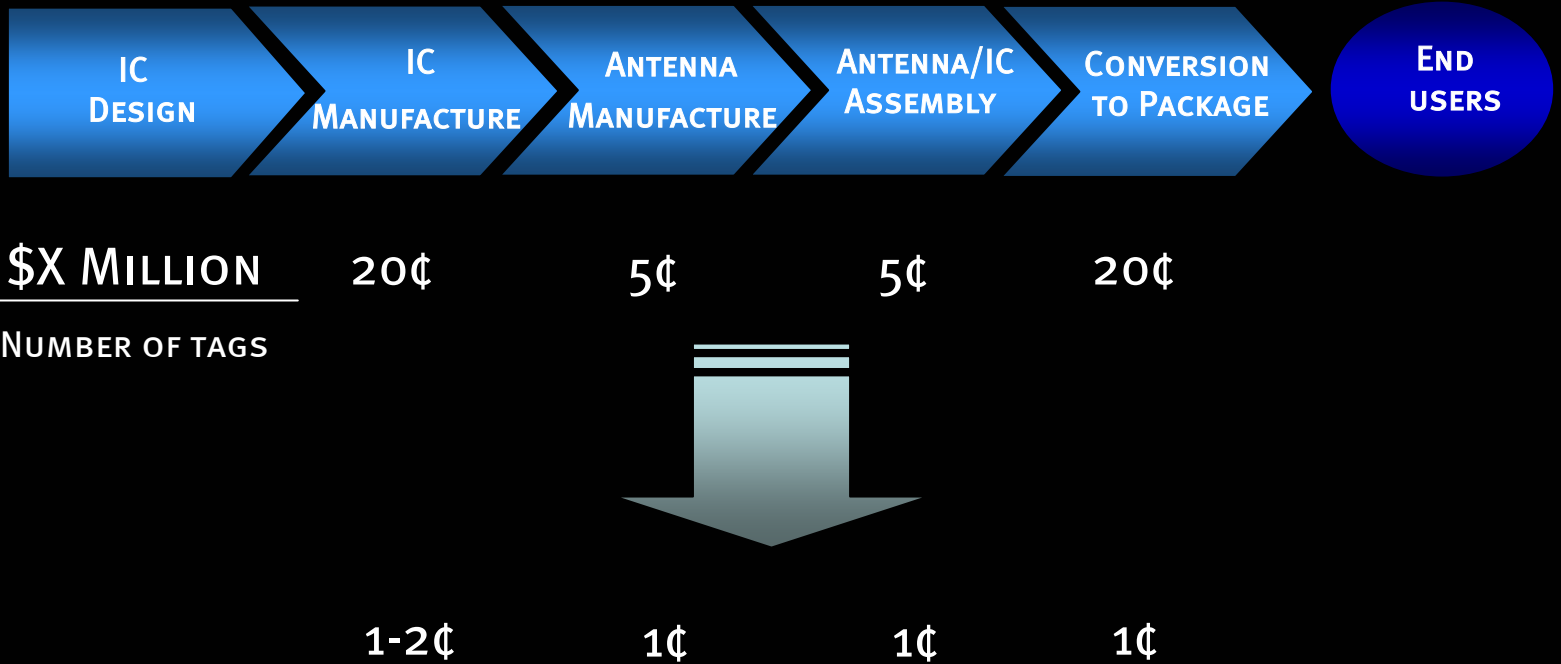


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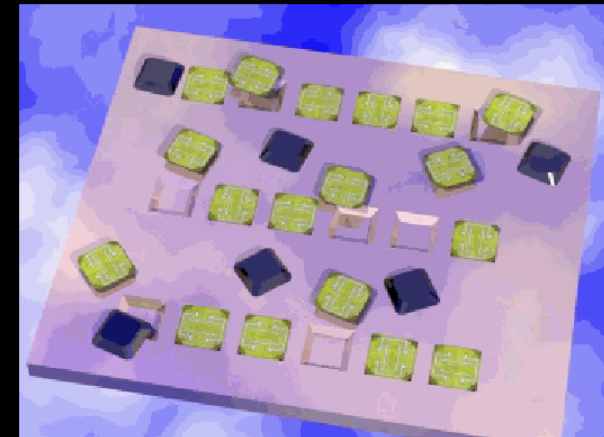
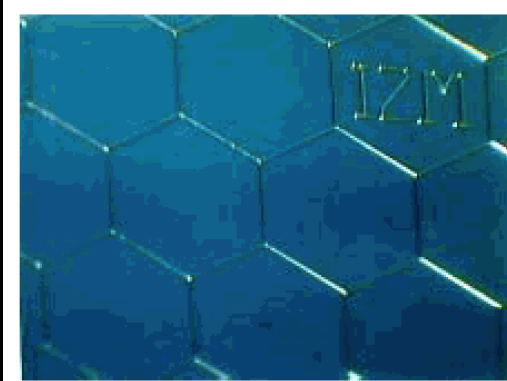
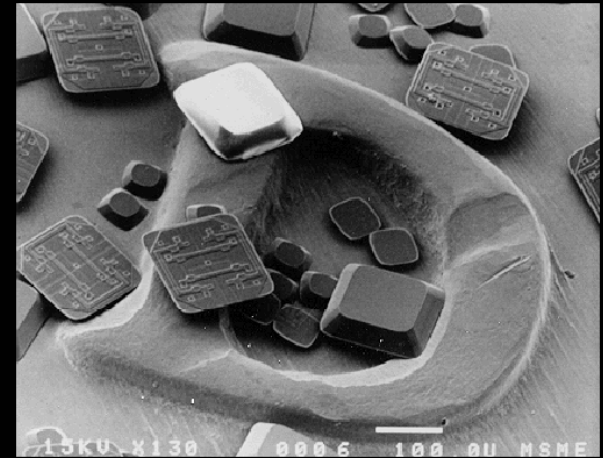
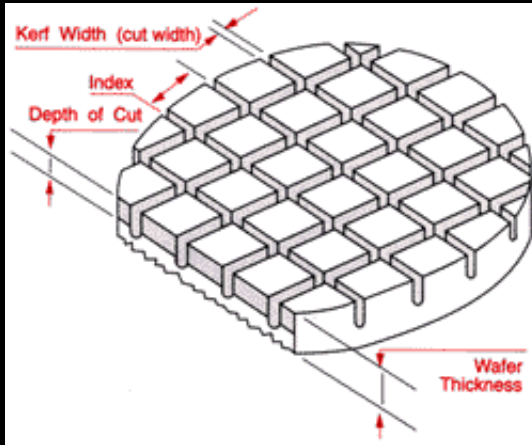


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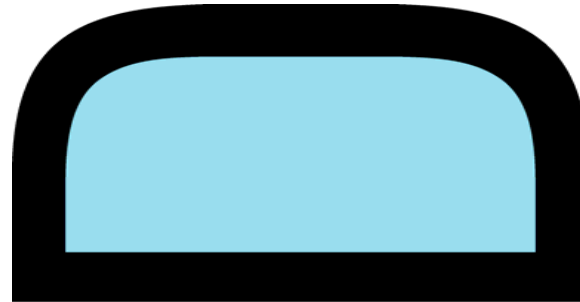




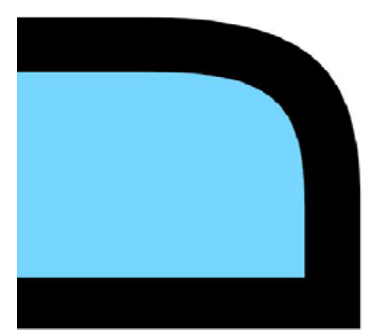
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EPCglobal



AUTO-ID CENTER



ID LABS

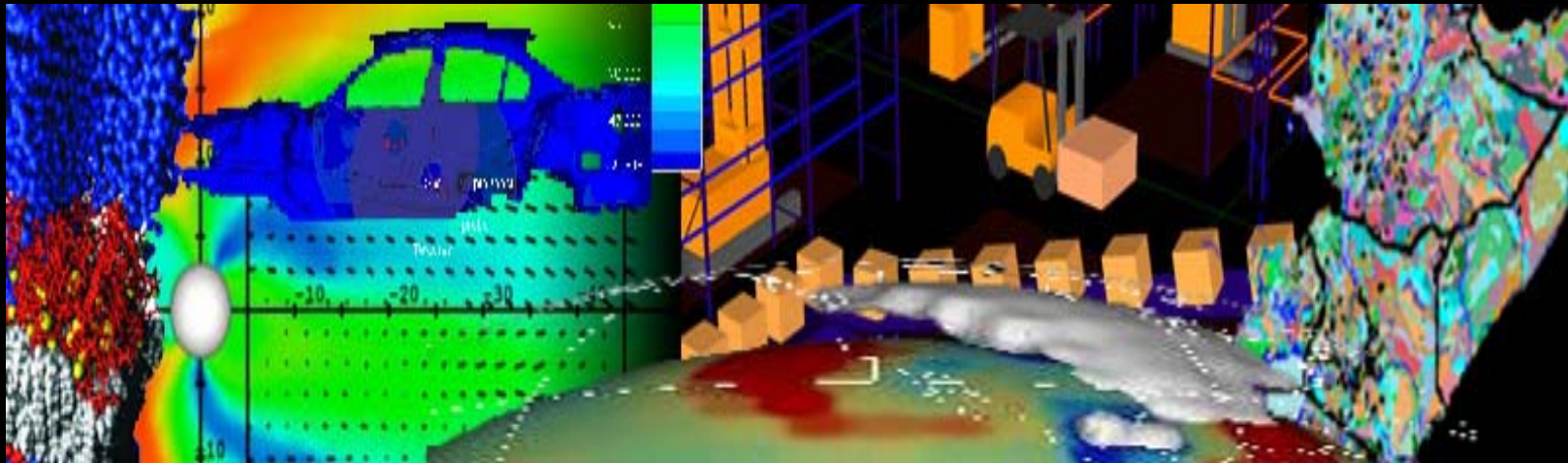


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DATA CENTER

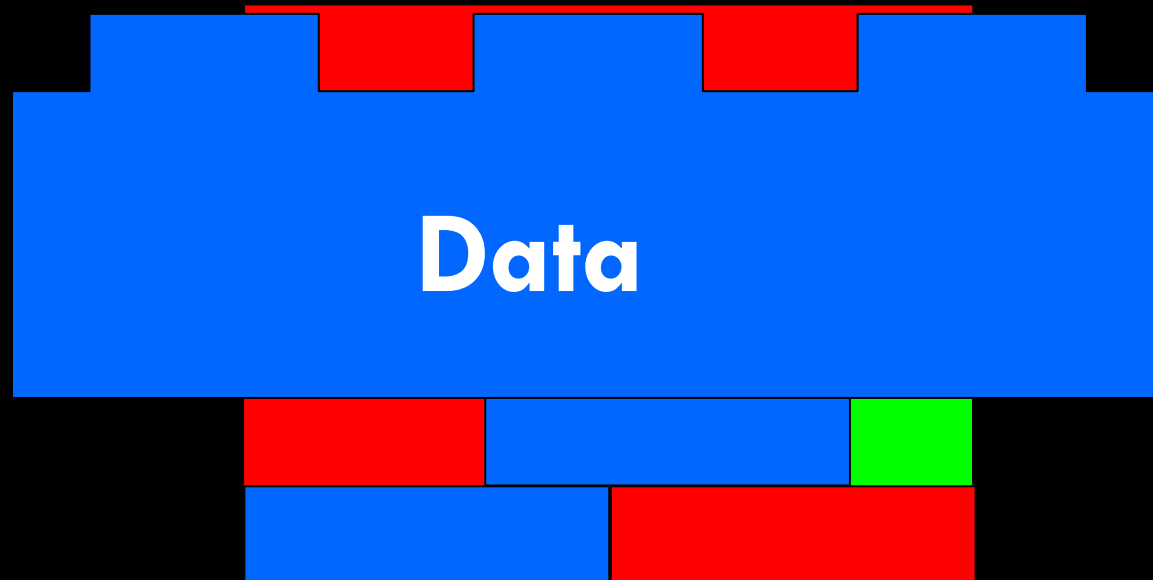
Make sense of your data



David Brock, Founder and Director
Data Center
Massachusetts Institute of Technology

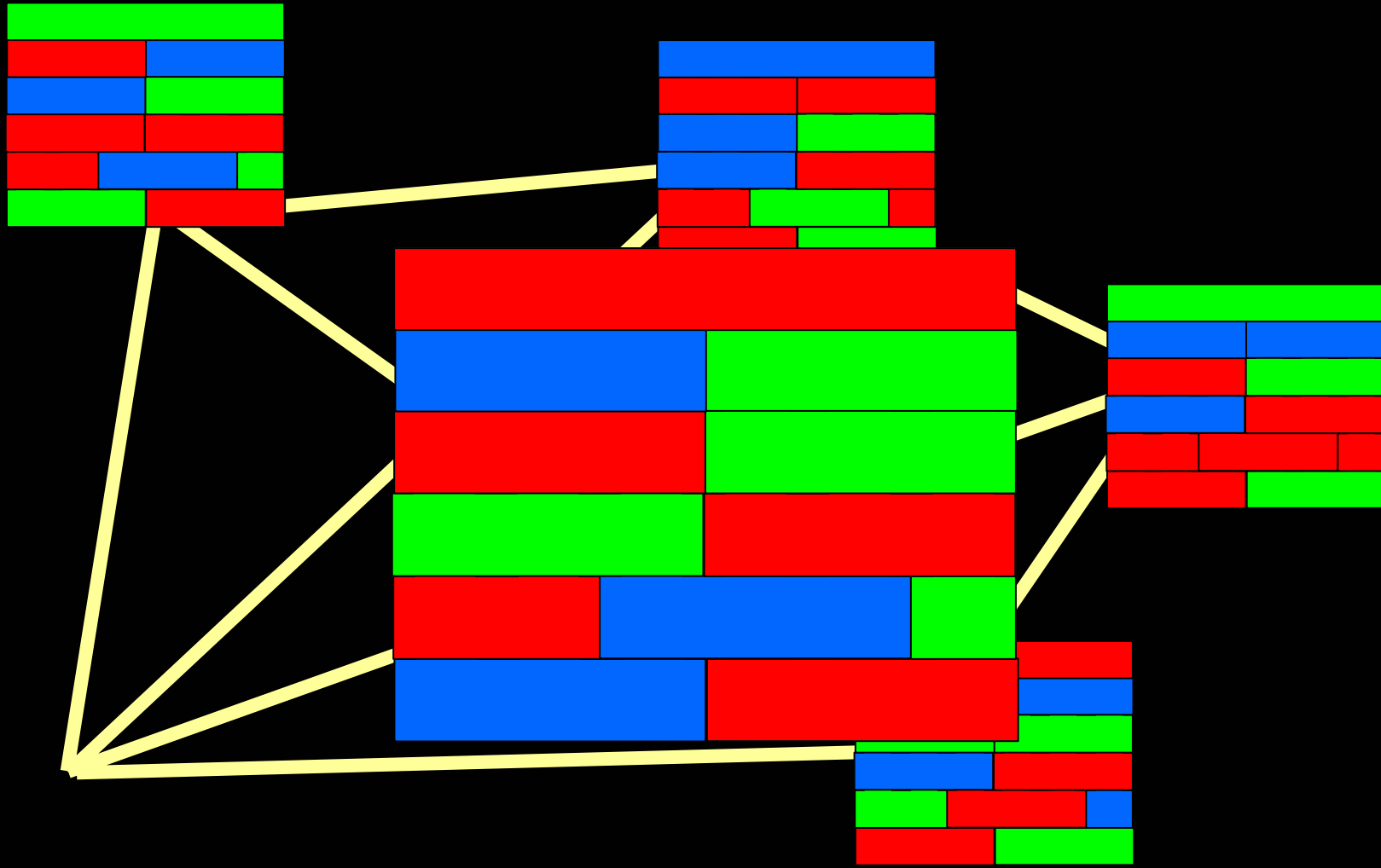
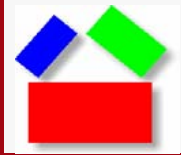


DATA





DATA NETWORK



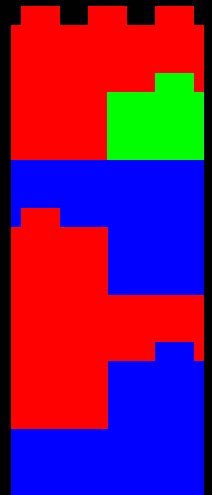
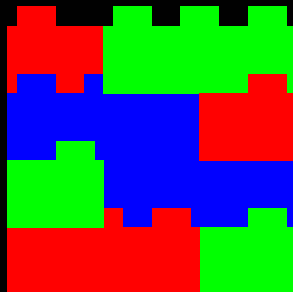
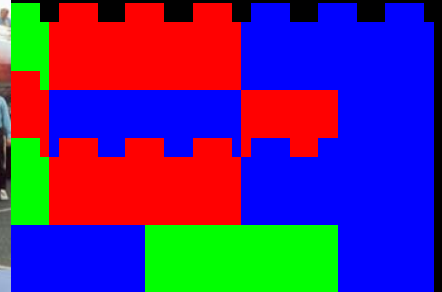
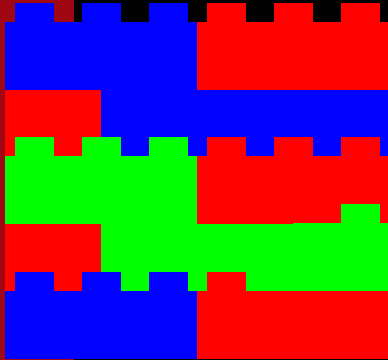


INTEGRATE





INTEGRATE





SYSTEMS

