IT Infrastructure, Informatics and Scientific Computing

IOM Forum on Regulatory Science

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Twin institutes under one roof on the UW-Madison campus

Opening Observations

- IT Infrastructure, Informatics and Scientific Computing
  - Distinct but interdependent – define each term.
  - Overlap in skill sets and people as one source of confusion.

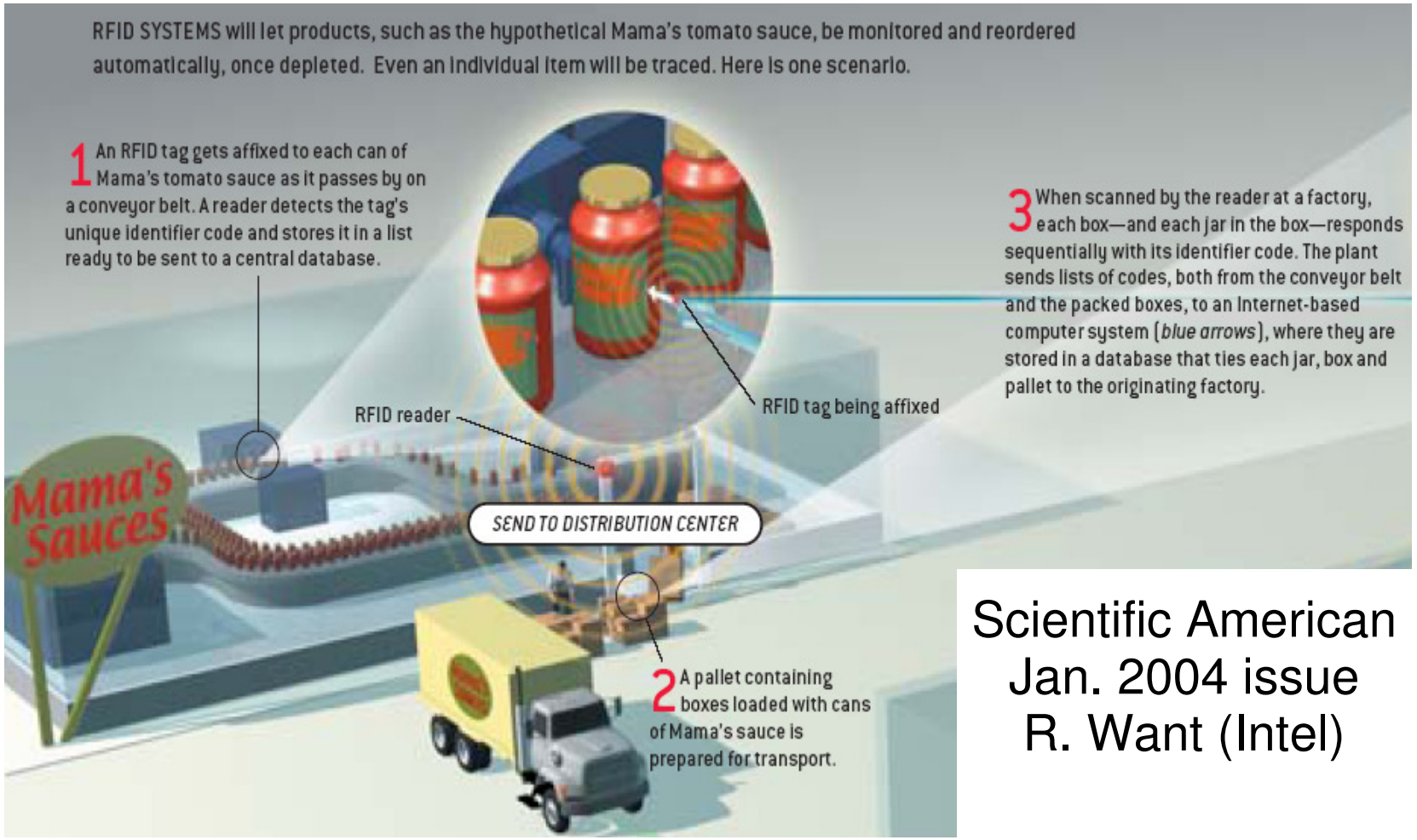
    Full disclosure: 15 years in scientific computing as UW-Madison Chem Eng professor; 6 years dealing with IT infrastructure as head of R&D IT in big pharma; and for the past 7 years academic research in "pharmaceutical informatics".
  - (Under)investment in ***scientific computing*** surfaced as concern in the IT subcommittee talks with FDA personnel. Today present IIRIS/COE as the cost effective approach to ramp up FDA capabilities in this vital area.
  - Collectively, they form a "platform technology" for regulatory science.

Definitions

- IT Infrastructure
  - Basic physical and organizational structures needed for the operation of an information system, e.g., data centers, networks, computer servers and storage systems and the organization of operations personnel.
- Informatics (Information Science)
  - The "science of information", the practice of information processing, and the engineering of information systems … studies the structure, algorithms, behavior and interactions of … systems that store, process, access and communicate information.
- Scientific Computing
  - Scientific computing … constructing mathematical models and numerical solution techniques and using computers to solve scientific problems.

Increasing expectations of a data/IT-savvy public

Example: RFID - the Electronic Bar Code and food safety

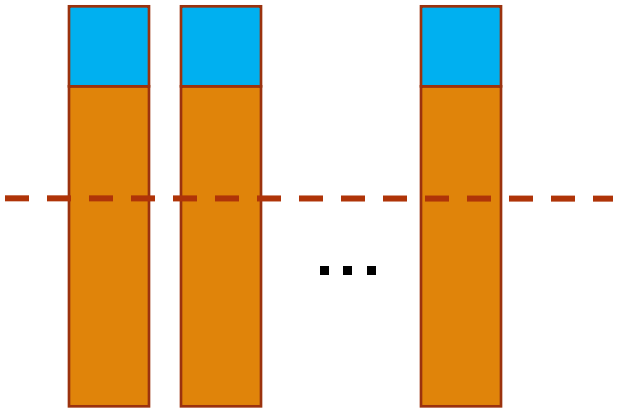


Scientific American
Jan. 2004 issue
R. Want (Intel)

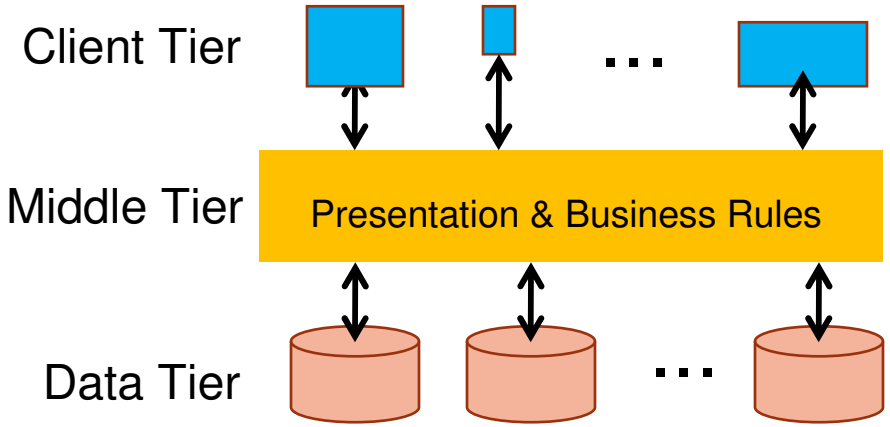
Model of data sharing in IIRIS/COE

enabled by FDA strategy & vision for future state

FDA Current State



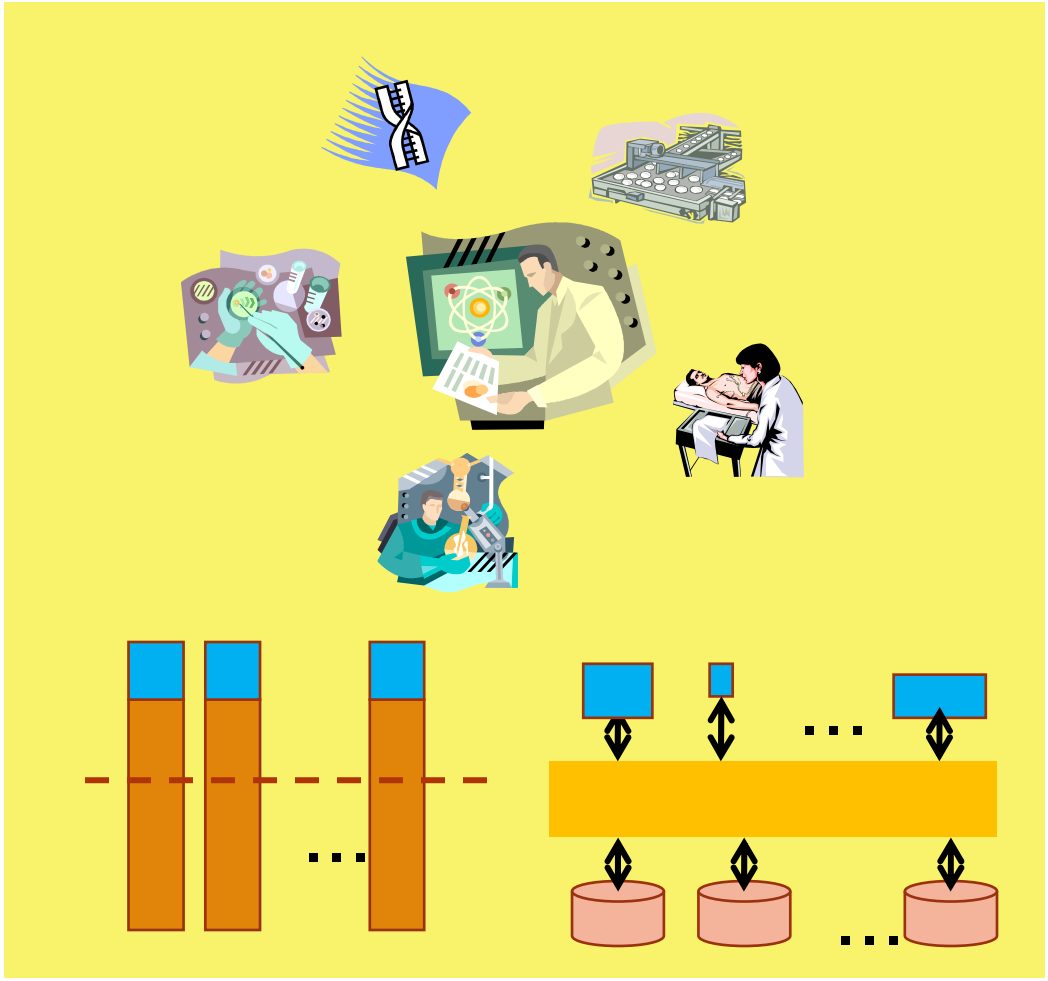
Migration is very expensive
(legacy of the past)

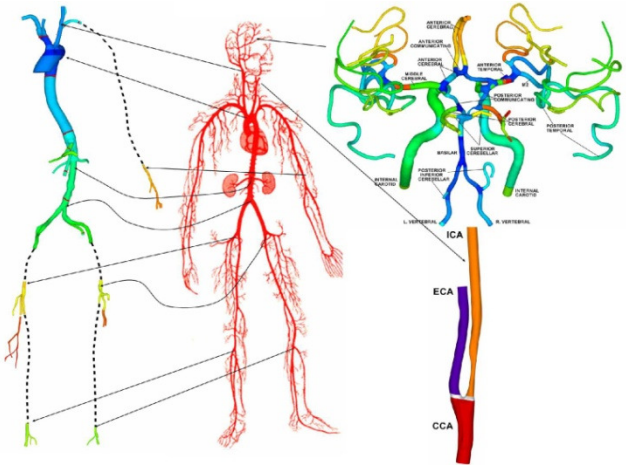


The Future State
Aligns with FDA strategy & vision
(migration would have been straightforward)

from S. Kim Science Board presentation – Aug. 17, 2009

Leverage world-wide scientific computing





Glotzer report (2009) on scientific computing: view of world-wide activity www.wtec.org/sbes

Conclusions and Discussion Points

- FDA IT Infrastructure
  - Major FDA investments underway – ICT21 – and with the transition from deficient to excellent IT infrastructure, the foundation is set for follow-on investments in informatics and scientific computing to leverage ICT21.
- Informatics
  - Rising expectations on safety issues from a data/informatics savvy public that is used to: social networking tech, tracking package shipments, new agile supply chains, …, will place more pressure on FDA, if FDA is not set up for success in informatics & emerging tech combinations.

Conclusions and Discussion Points

- Scientific Computing
  - Scientific research no longer drives commodity computer-chip designs; creative response by world-wide network of scientists; increases relevance of the IIRIS-COE hub model for regulatory scientists to access functional scientific models and algorithms.

- Platform for IIRIS/COE Network
  - The "-omics" of emerging regulatory science challenges and opportunities depend on the triadic foundations of IT infrastructure, informatics and scientific computing.