

# Information Infrastructure Technologies

Introducing the Concept of an

***Institute for Advanced Computing, Communications & Control***

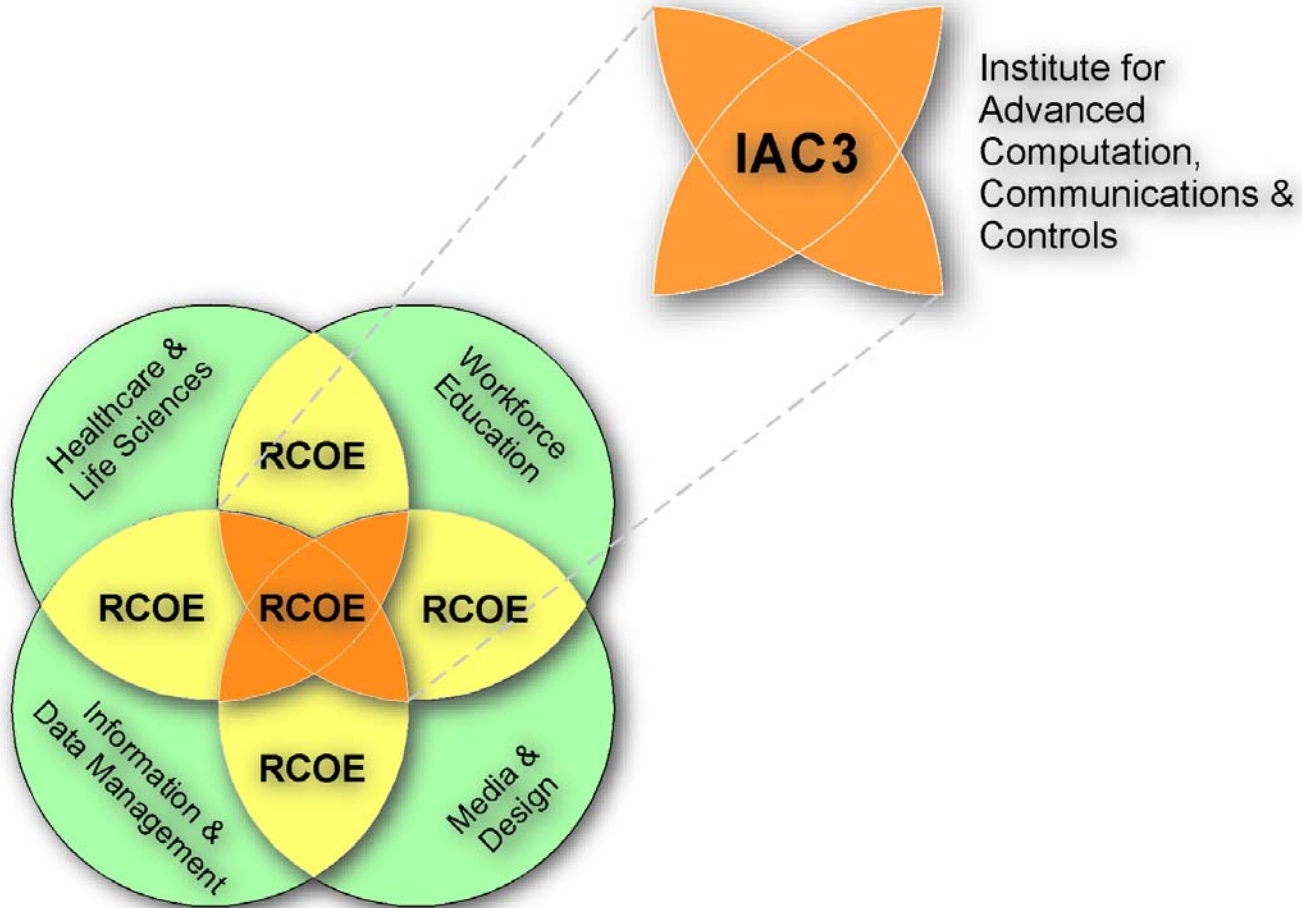


**Jay S. Bayne, PhD**

Founder, Echelon 4 LLC

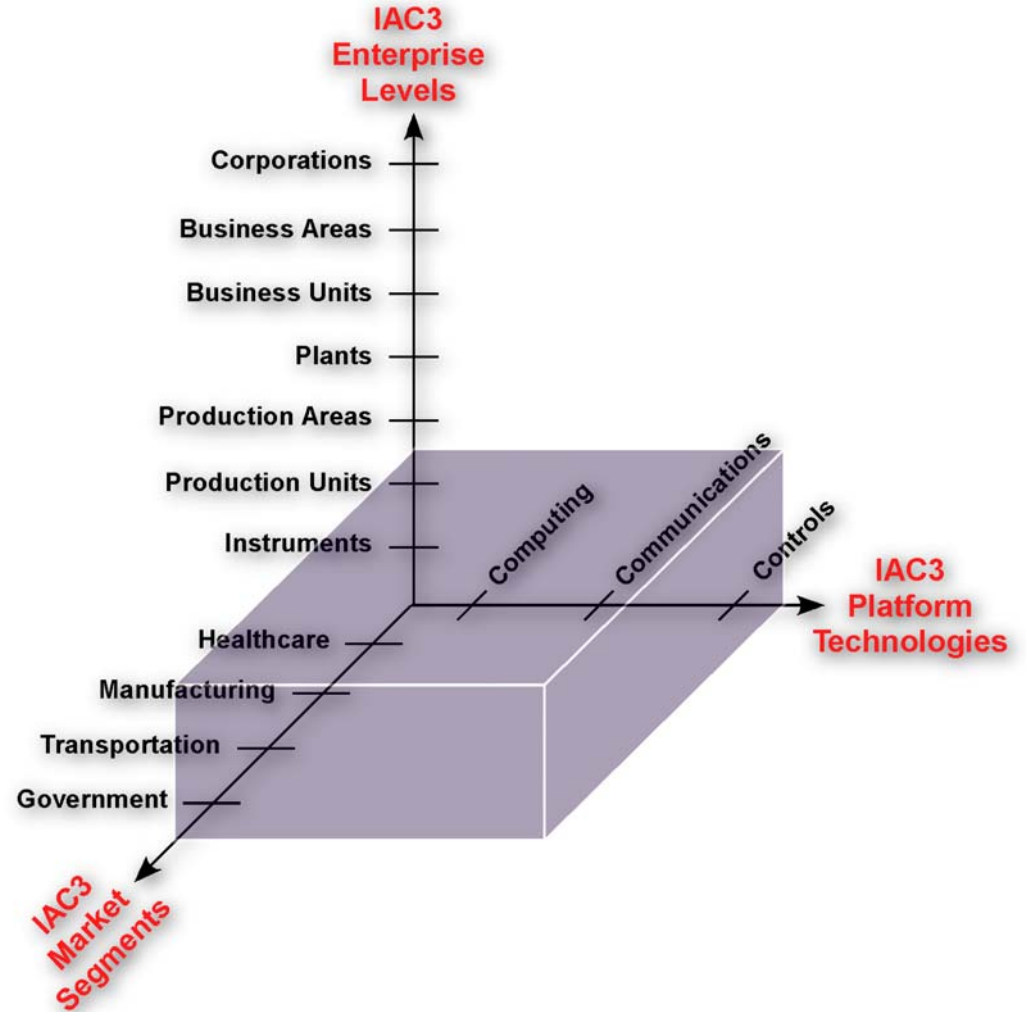
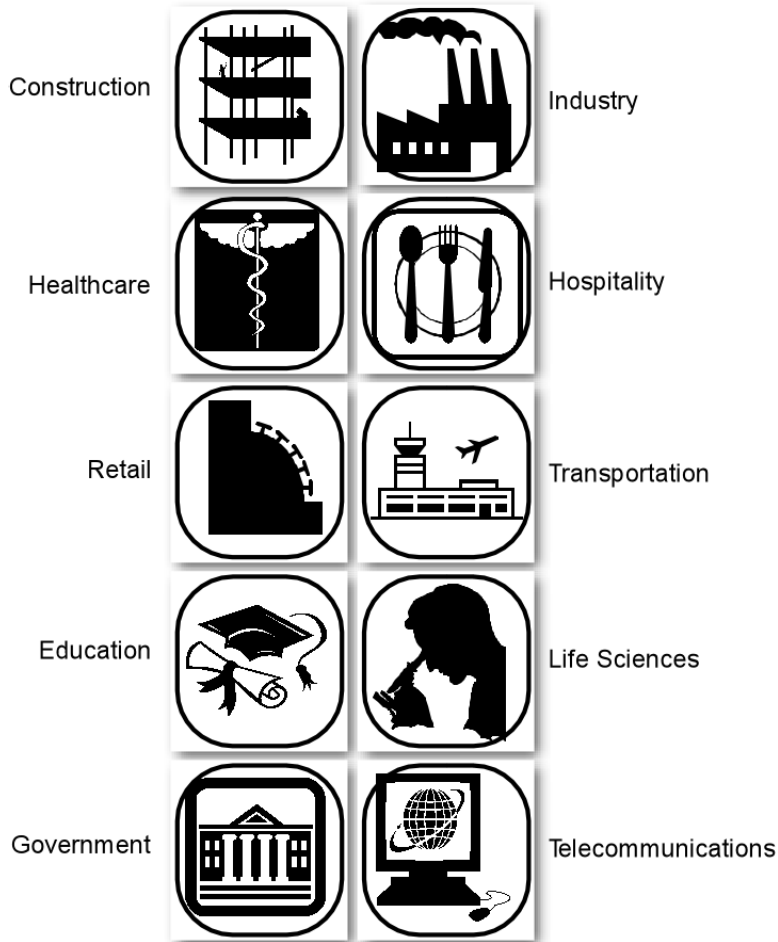
# Core C3 Technologies

Research Center of Excellence for  
Information Infrastructure Technology

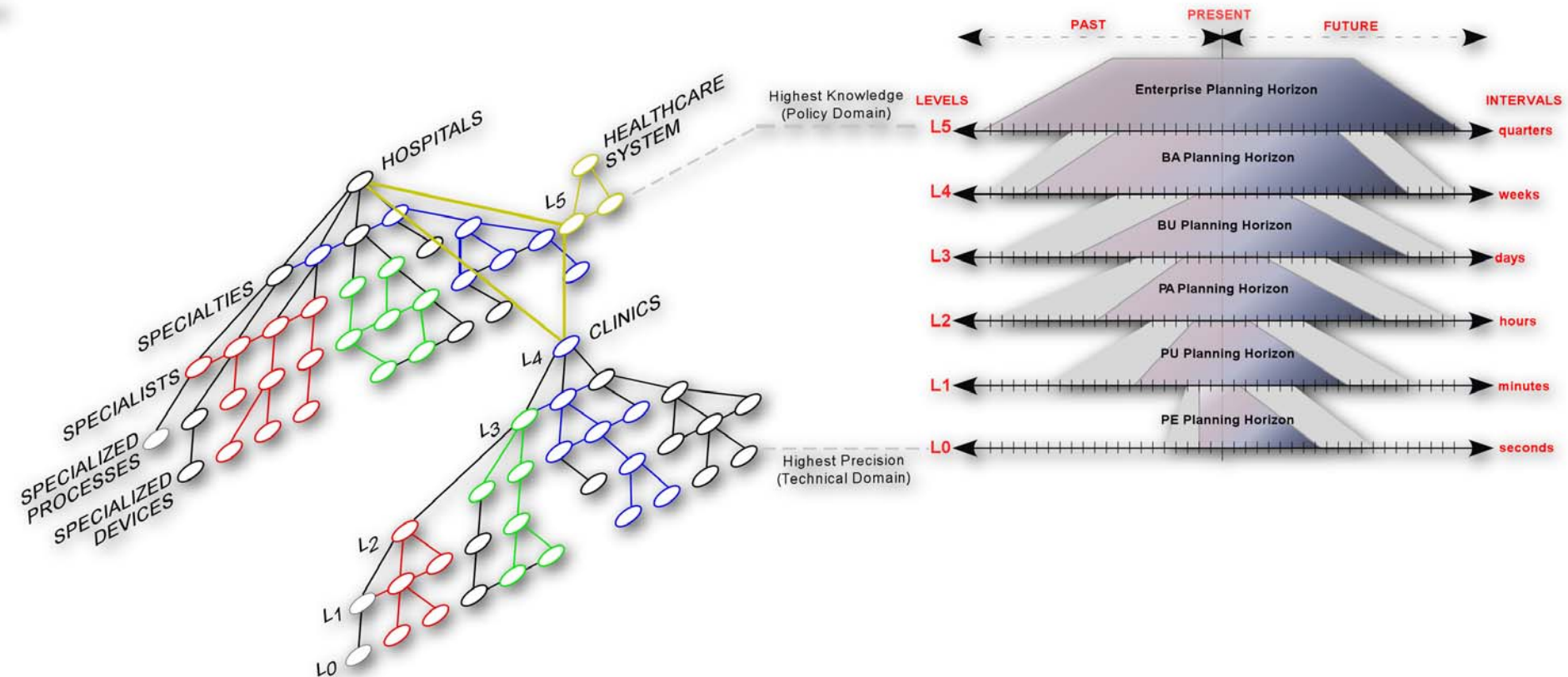


**Information Infrastructure Technologies**

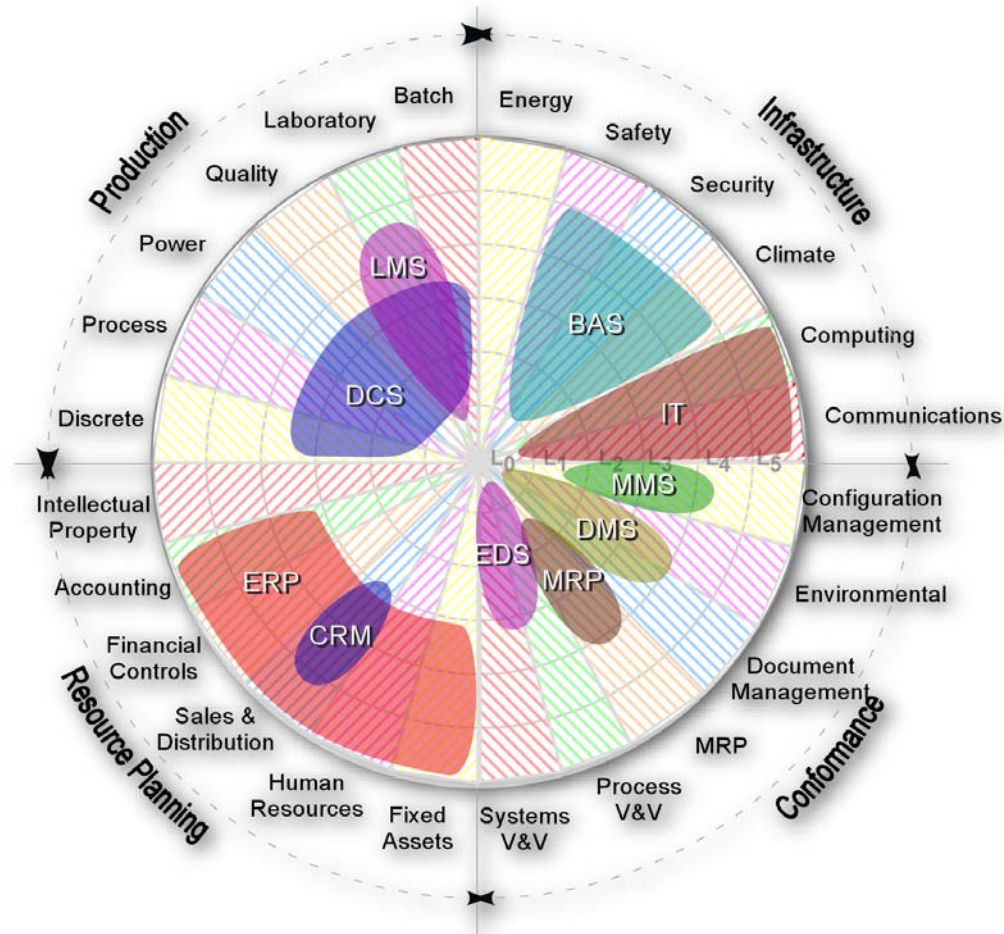
# Rich Innovation Space



# Application Space Dimensions



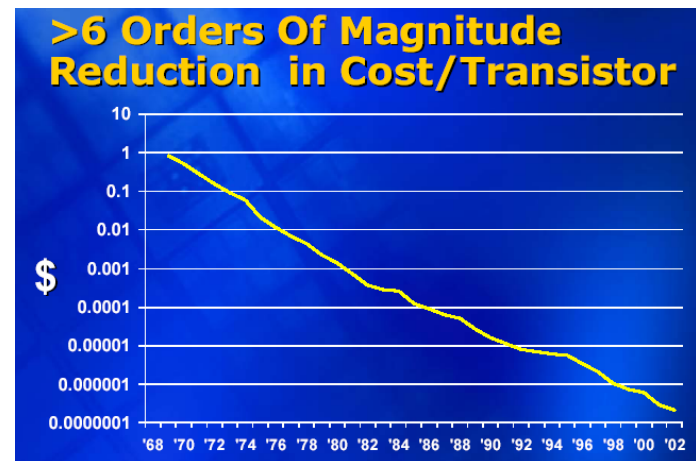
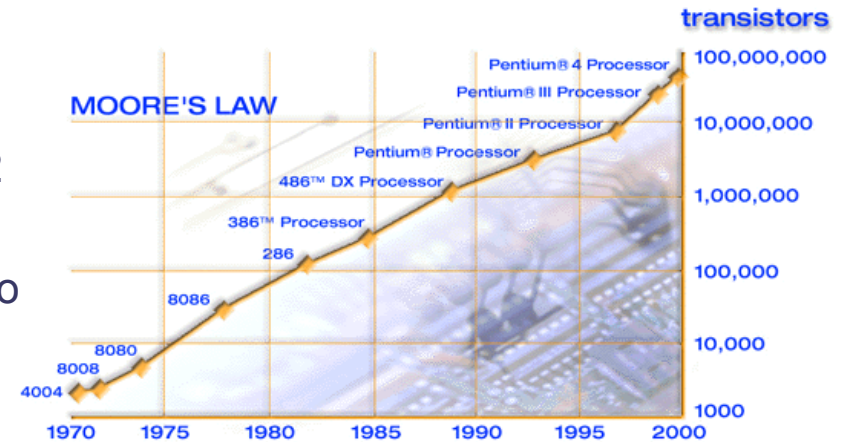
# Enterprise Application Domains



## Information Infrastructure Technologies

# Computing System Drivers

- Moore's Law: Chip densities double every 18 months
- Gilder's Law: Network bandwidth triples every 12 months
- Metcalf's Law: Value of a network is proportional to square of number of nodes
- Storage Law: Storage costs decline ~50% every 16 months
- DRAM Law: Storage density rises ~60% every 12 months (3x in 3 years)
- Disk Law: Disk density increases ~25% every 12 months (2x every 3 years)
- Program Law: Programs grow in storage requirements by ~2 every 12 months

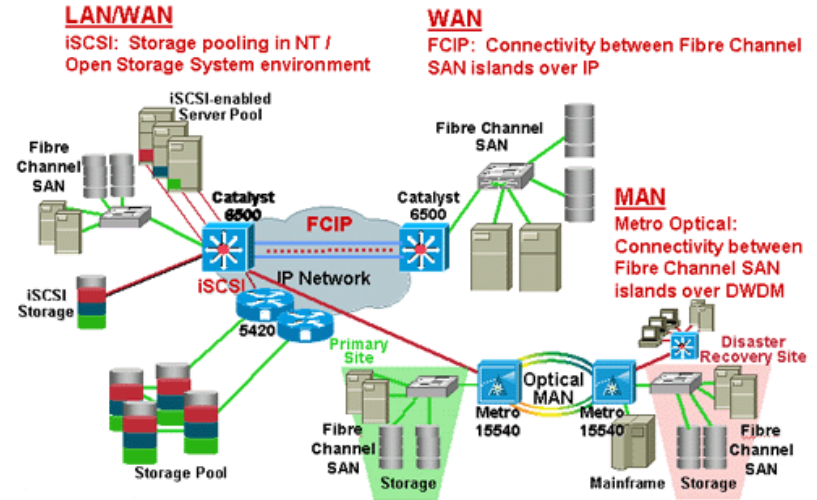


Processing, storage and communications are becoming pervasive and essentially free, with licensed software and services the primary basis for value generation.

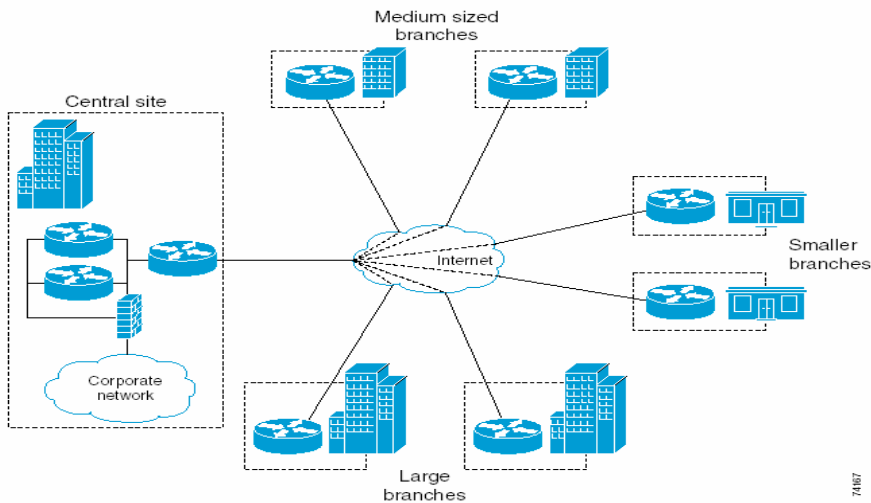
# Communications System Drivers

- Next Generation Internet
  - Voice, Video, Data, Telemetry, Image
- Naming, Security, Routing, QoS
- Global Grid Computing

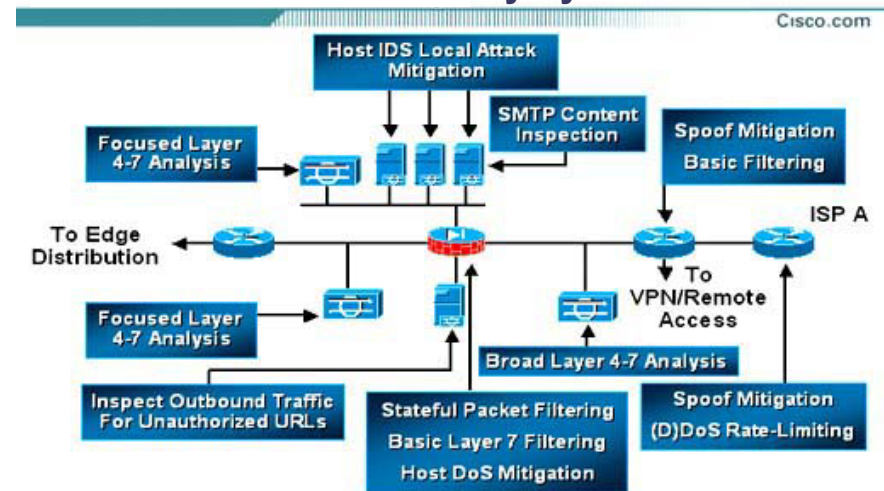
## Distributed Storage Systems



## Virtual Private Networks

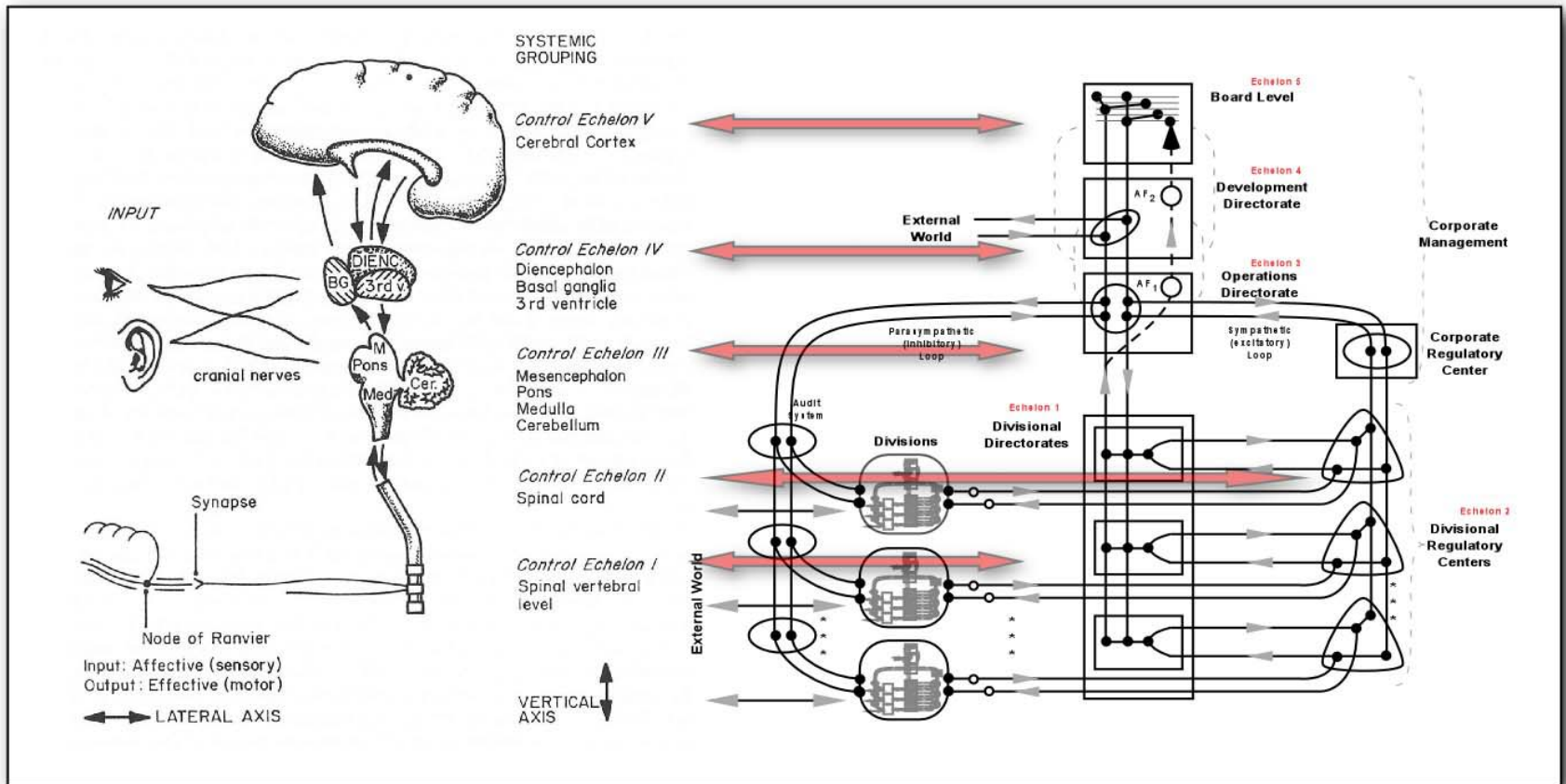


## Network Security Systems



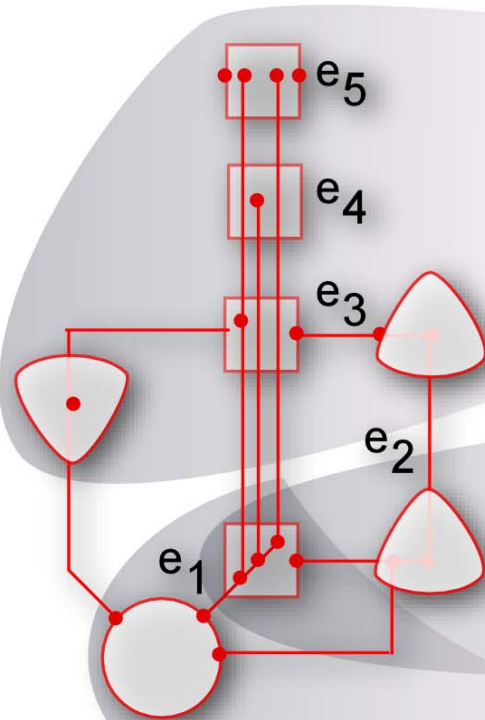
# Control System Drivers

Innovation drives convergence of sciences of natural and man-made systems, encouraging multidisciplinary approaches to solution of complex social and technical problems ranging from nanoscale to terascale.

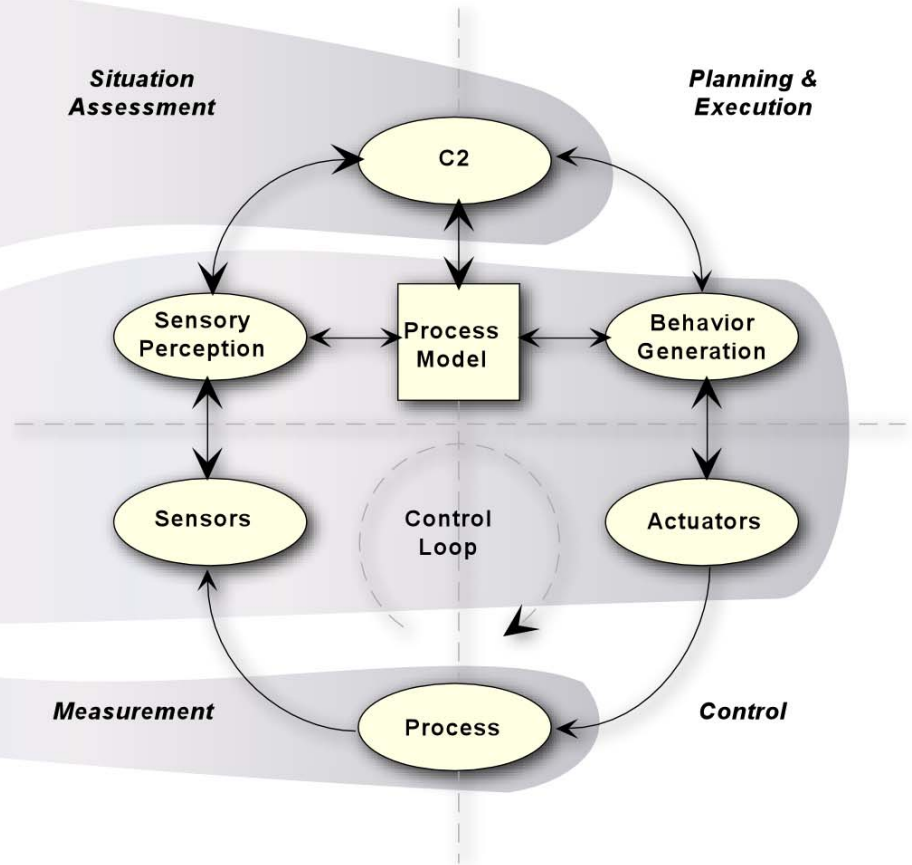


# Cybernetics – Systems of Systems

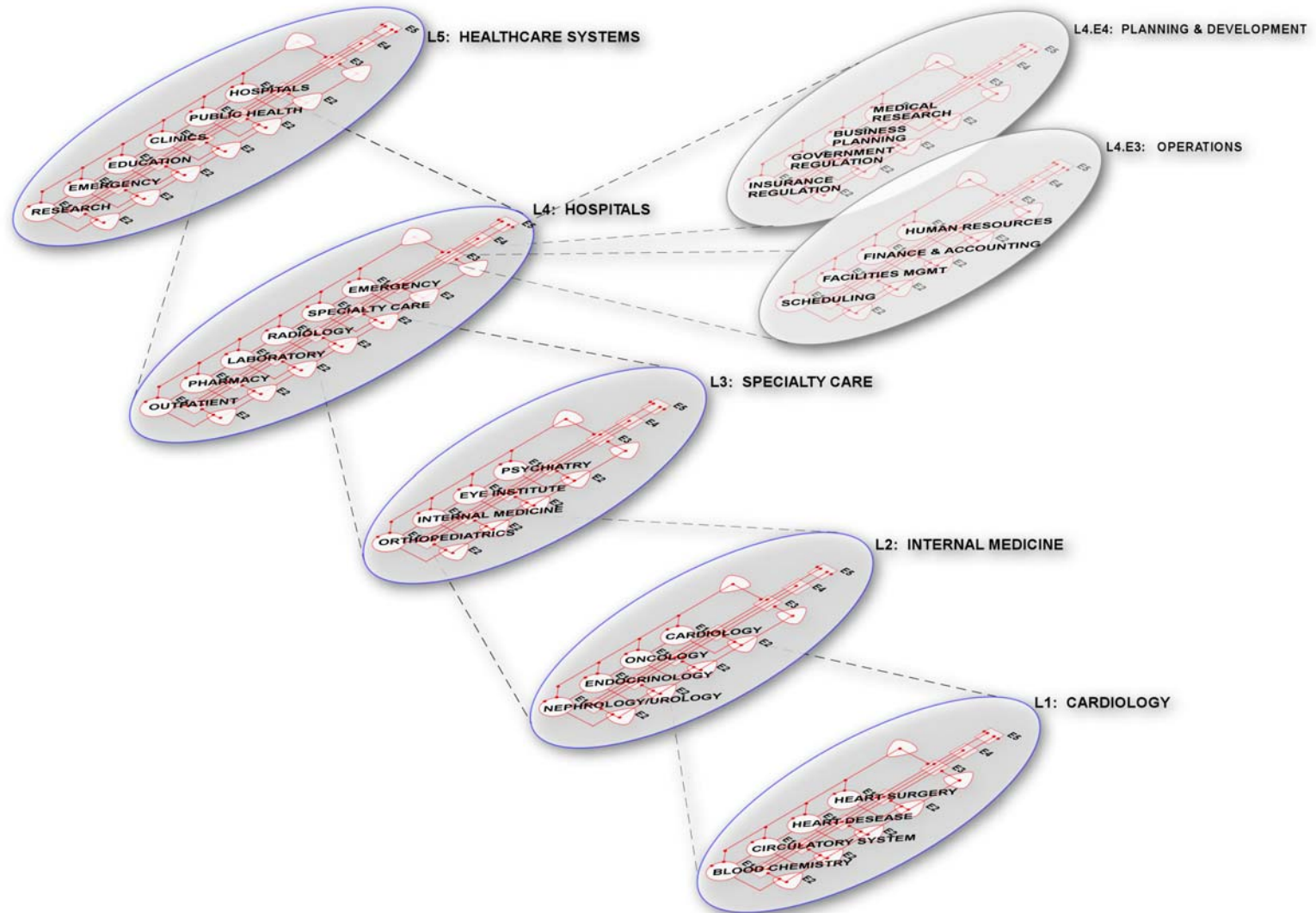
## Viable Systems Model



## Intelligent Agent Based Software

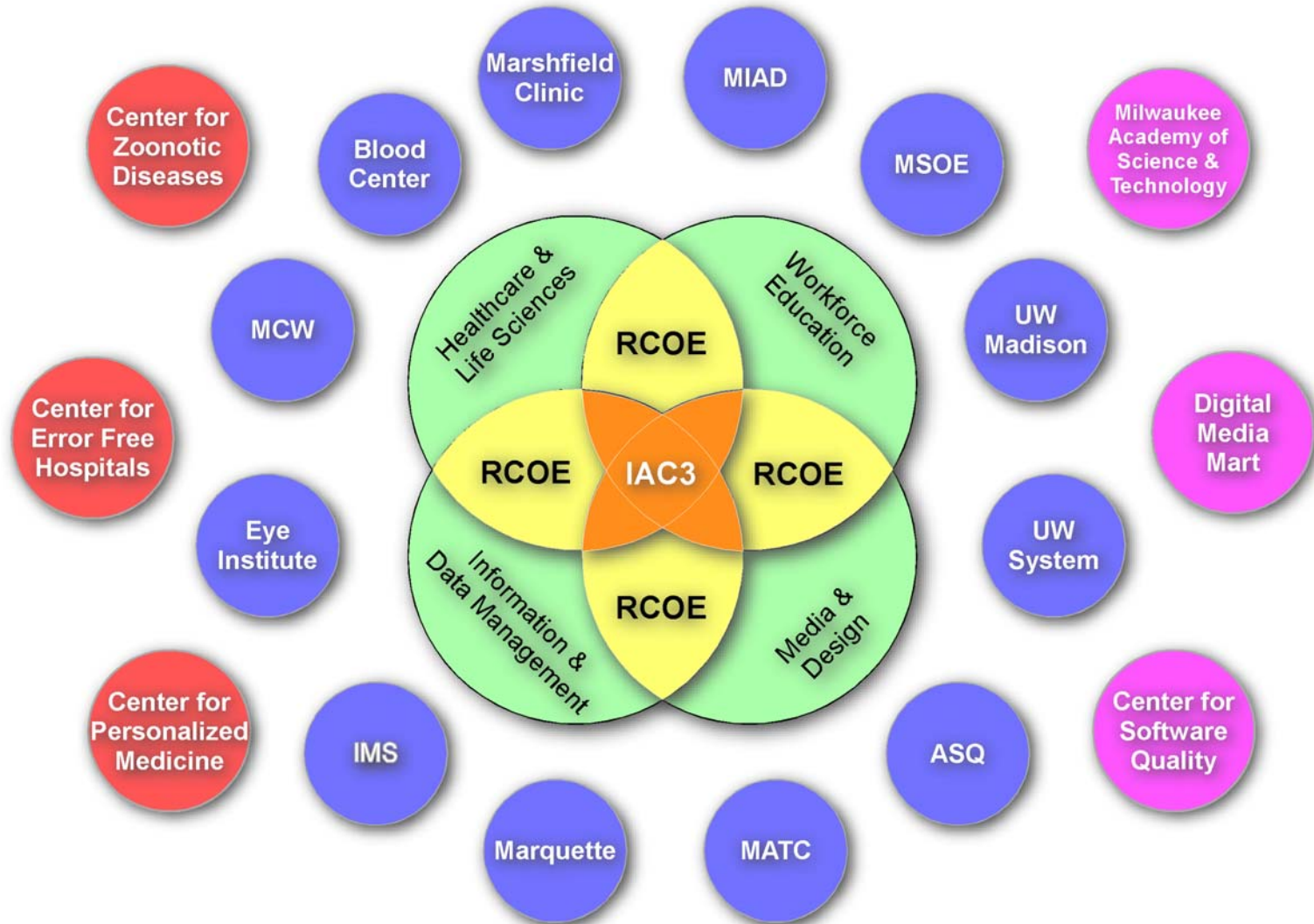


# Ex: Integrated Healthcare System



## Information Infrastructure Technologies

# Innovation Constellation



## Information Infrastructure Technologies