


# **Active Management of Healthcare Operations: A Dynamic Systems View of Healthcare Delivery**



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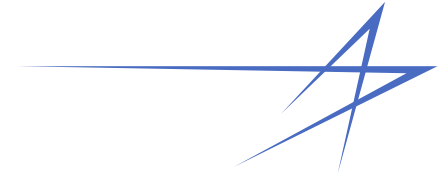
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**SOA IN HEALTHCARE CONFERENCE**  
*Improving Health Through Technology:  
The Role of SOA on the Path to Meaningful Use*  
July 12-14, 2010 - Arlington, VA USA

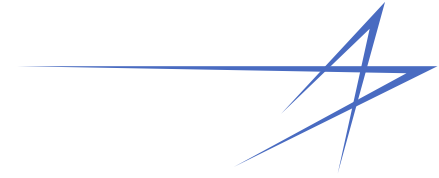


# Abstract



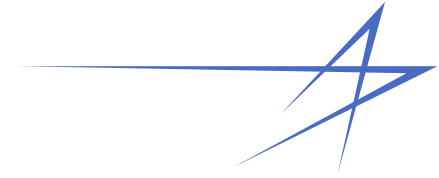
***This presentation describes a framework for decision making and management of healthcare operations through the application of dynamic resource management (DRM) using information technology for what we call Active Management of Healthcare Operations (AMHO).***

# Introduction



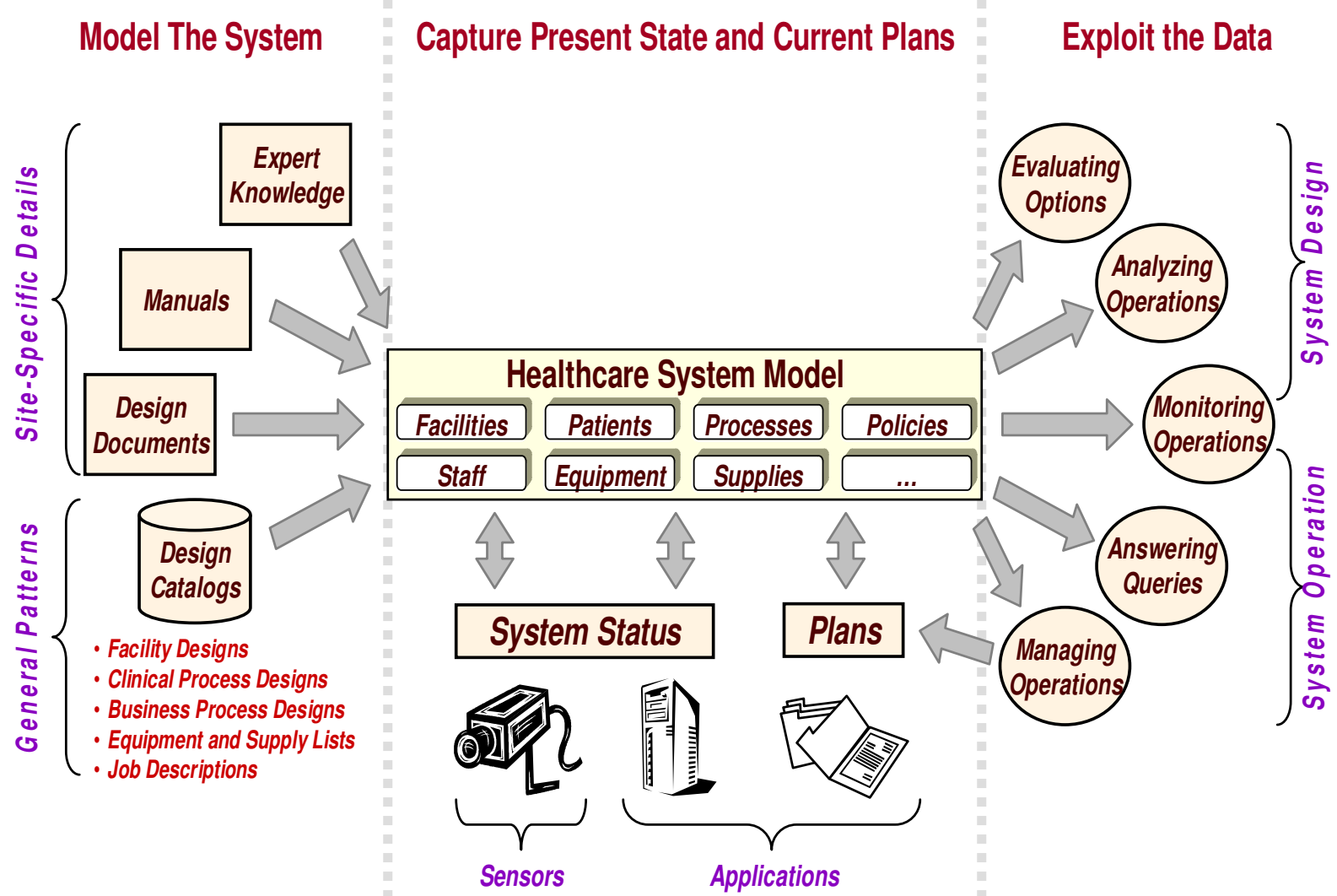
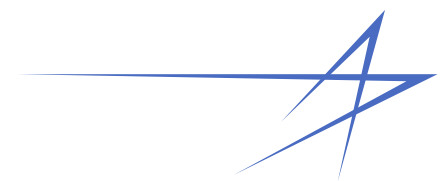
- ***Medicine faces a new set of challenges that have much less to do with the patient than with the systems of care used to service the patient.***
  - ***Advances in computing, networking, sensing, and medical device technology***
  - ***Independent advances lack proper interoperation amongst themselves as well as with policy and governance***
- ***Many stakeholders and interdependent elements involved in solving the modern day problems of improving the efficiency, quality, and cost effectiveness of healthcare***
  - ***Government policy and regulation***
  - ***Free market forces: healthcare device and system manufacturers***
  - ***Clinician knowledge and skills***
  - ***Healthcare facility design and structure***
  - ***Culture, patient demographics, patient knowledge, and how people live their lives***

# Systems Approach to Healthcare Delivery



- ***Create a holistic, system view of healthcare delivery: an interactive, integrated model for healthcare decision support called the Active Management of Healthcare Operations, or AMHO.***
- ***Explore the impact of decision making at all levels from National policy, local medical facility policy and near real time delivery of healthcare at the patient level in the context of a specific medical care delivery protocol, introduction of policy change, or impact of new medical technology and procedure.***

# System View of Healthcare Delivery



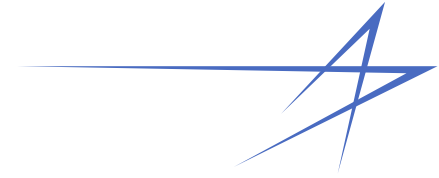
# Exploit Information to Improve Performance



*Harvest information from various sensors, repositories, and software applications running within the enterprise. The information used in the supporting model is exploited in order to:*

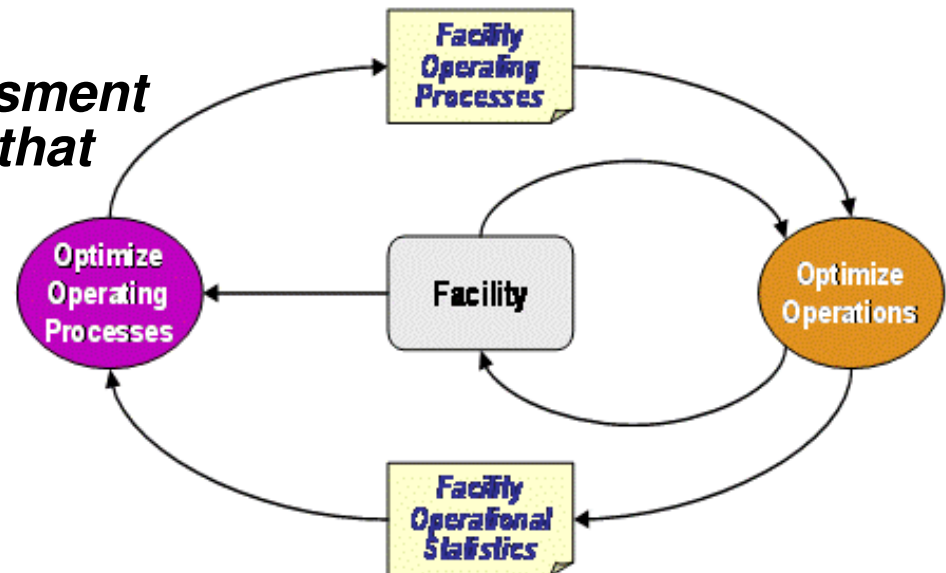
- *Optimize on-going and planned operations.*
- *Answer questions about the present or planned future states of the enterprise.*
- *Examine data on how the enterprise has functioned over specified periods of time.*
- *Analyze in a range of ways the structure and operation of the enterprise.*
- *Evaluate the likely impacts of specific proposed internal and external changes on the enterprise.*

# Core Process



***We exploit the information organized around two classes***

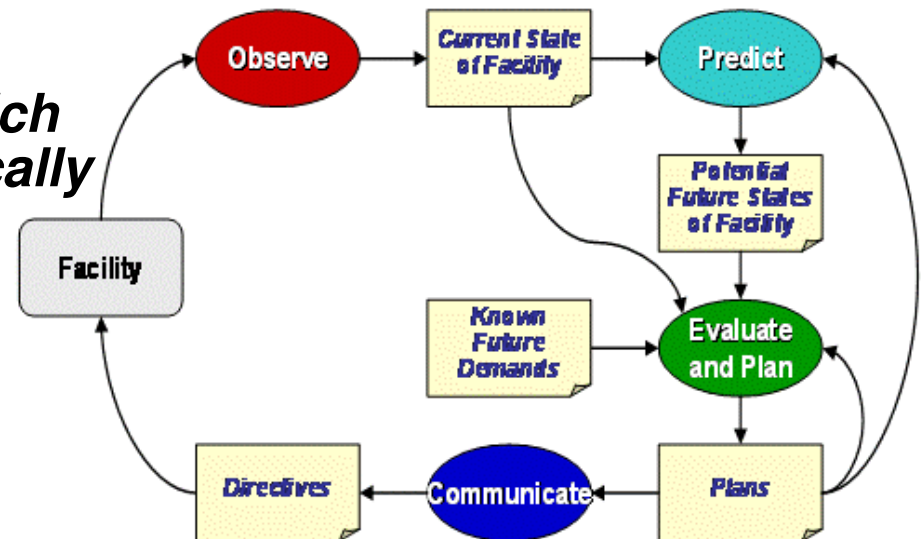
- ***Those activities that occur as part of the day-to-day operation of the subject healthcare system.***
- ***Those that address its assessment and reengineering of factors that impact system performance.***



# Optimize at Two levels

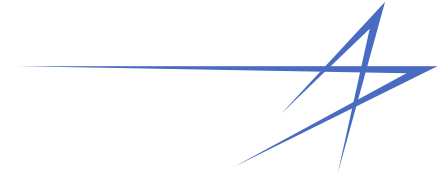


- **The optimization of facility operations occurs at two levels**
  - **The AMHO works to ensure that maximum performance is achieved given the processes established for the facility**
  - **The AMHO system constantly evaluates the established processes to identify opportunities for improvement.**
- **The latter feature differs from conventional approaches in which changes are explored a periodically and outside of the operational environment.**





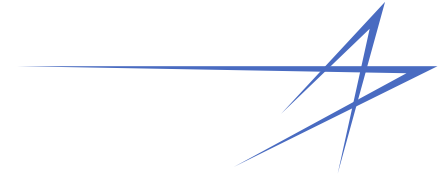
# What Should We Optimize?



***All aspects of the healthcare enterprise's operations:***

- ***Treatment plans***
- ***Patient transportation plans***
- ***Medical appointments***
- ***Space and equipment allocation***
- ***Supplies inventory, storage, and allocation.***
- ***Work schedules and assignments***
- ***Facility/equipment maintenance schedules***
- ***Internal audit / quality assurance plans***

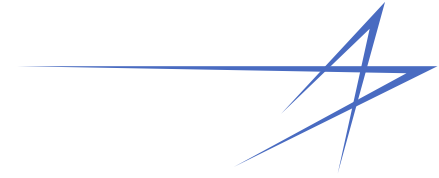
# What Should We Optimize?



***Externally established requirements but internally written procedures:***

- ***Clinical guidelines/protocols – statements of “best practice”***
- ***Healthcare regulations – rules (e.g., like those imposed by JCAHO or Medicare)***
- ***Licenses, certifications, credentials, and privileges***
- ***Health care plans***

# Adaptive Framework for Quality of Service



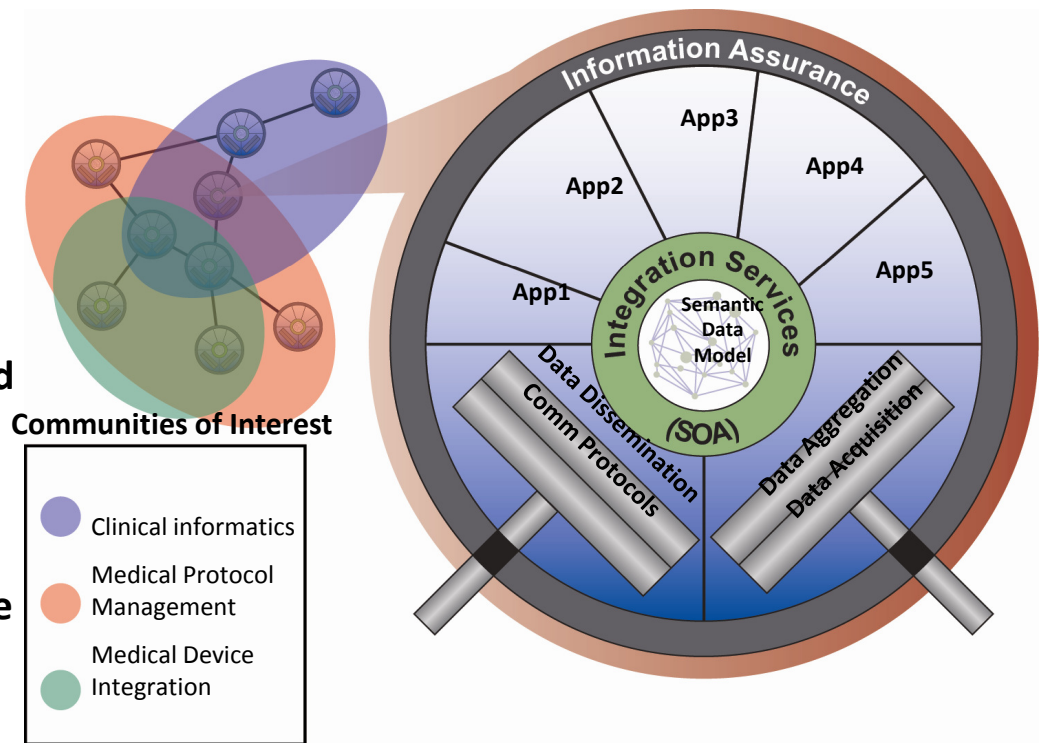
- *A large volume of information resident across many applications necessitates a flexible, efficient approach for the integration across systems and monitoring of the delivery of Quality of Service (QoS) in healthcare operations.*
- *There is no straightforward method for healthcare personnel or system architects to describe how resources should be allocated in an environment that is complex, dynamic, information-rich, and time-sensitive.*
- *Our approach is an infrastructure for dynamic resource management (DRM) and QoS within an adaptive integration framework we call the Quality Connector. The Quality Connector (QC) is a framework for managing end-to-end provisioning of heterogeneous resources in support of mission-driven resource management*

# Healthcare Informatics Integration

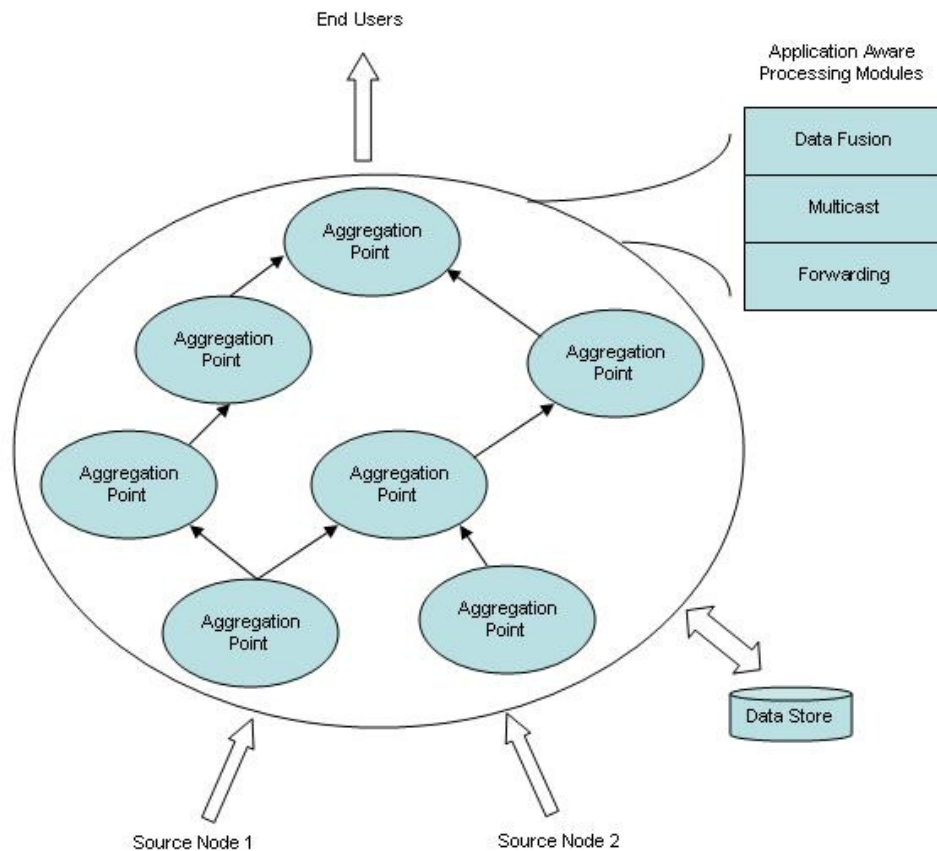
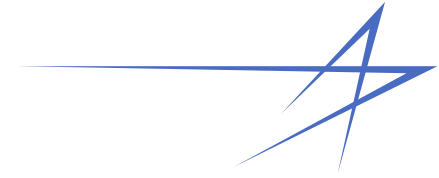


## Framework Properties

- Asynchronous operation in intermittent connectivity environments
- Operates through a loosely coupled set of Nodes
- Provides authentication, certification, integrity, availability and confidentiality
- Provides and / or requests services based on node type and business rules
- Supports inter-nodal interaction through the Data Dissemination Layer (DDL)
- Integrates and processes data through the Data Aggregation Layer (DAL)
- Supports role based Situational Awareness



# Aggregation



## Network Aware Applications Provide Host level Network Services

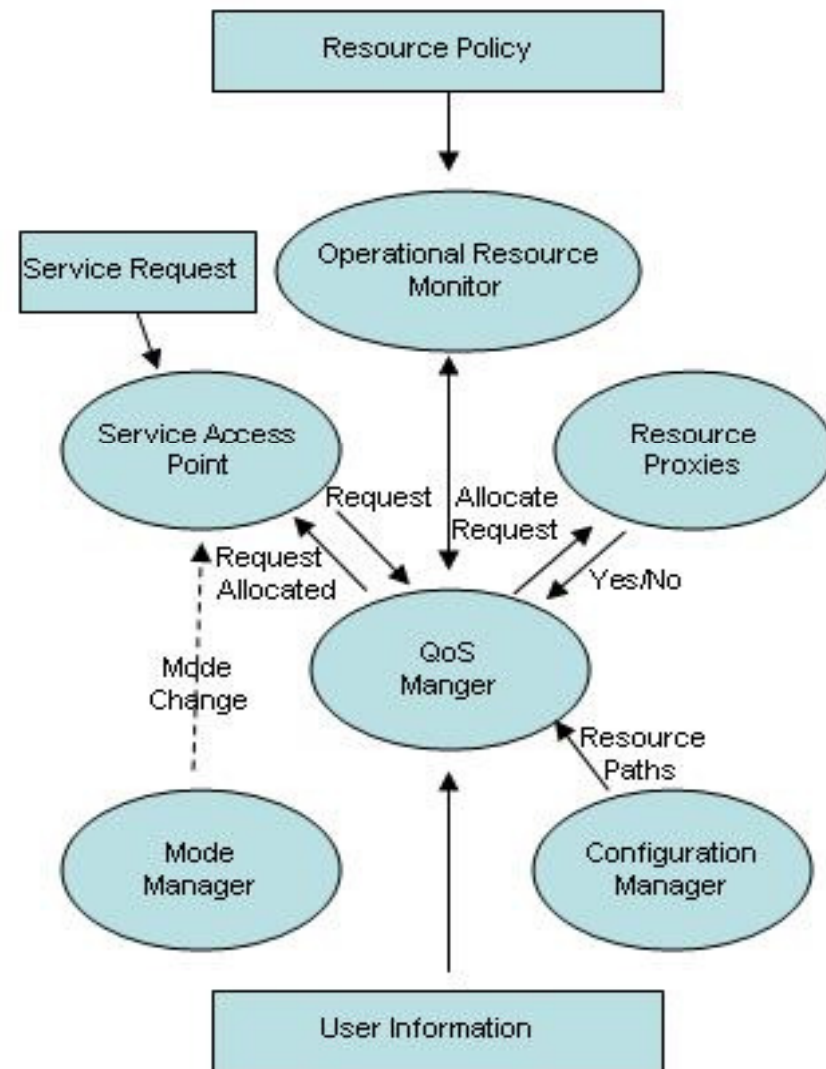
- Data aggregation
- Efficient dissemination via overlay networking (multicast for example)
- Content based routing/forwarding (policy based networking)

# Quality Connector (QC) Framework

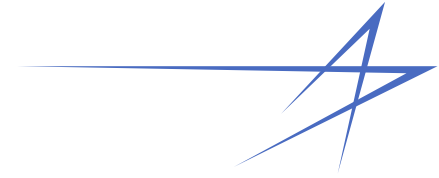


## QC Provides Operational Resource Allocation

- Users or machine-to-machine
- Roles defined via registry service
- Includes infrastructure services (email, chat, data distribution.....)
- Use Information exchange requirements to allocated resources
- Define modes during system architecture process

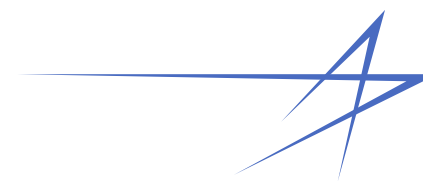


# The Value of AMHO



***The AMHO is about capturing factors that might influence how proposed plans and current activities unfold and provide visibility into the range of possible outcomes. Example capabilities include:***

- ***Clinical prognostic aids***
- ***Resource projection***
- ***Predictive failure management***
- ***Surge/emergency planning and real time response (situational awareness)***
- ***Financial forecasting***



# QUESTIONS?