# Moving Forward: SOA's role in Indian Health Service IT Modernization

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Indian Health Service

# Topics

- Why Medicine and SOA
- Indian Health Service
- IHS Health Information Technology (HIT)
- Interoperability of EHRs
- SOA
- Open Source

# Why Does SOA matter in Medicine and Health

- Medicine is dependent upon the ability to synthesize data in predictable  as well as novel patterns
- Diagnosis is dependent upon interoperable interactions in thought as well as action
- Clinical reminders are predictable, YET are dependent upon the individual patient
- There seem to be natural building blocks that can help organize multiple data feeds
  - Combine data, knowledge and behavior
- *Policies, practices, and frameworks must ensure that the right ideas and data (services ) are provided and available for inclusion in the decision making process*

# A world without SOA

- Clinical decision making and clinical care remains where it is today
  - The SOAP (subjective/objective/ assessment/ plan) recording model makes sense for a paper based system
  - The SOAP model made sense as the basis for initial HIT systems
    - However, this model is modular/constrained/predictable/defined
- Data being isolated at a facility level and not readily accessible across the enterprise
- Health Information Technology can not progress without a radical change in its interaction with providers and patients

# A world with SOA

- The leap to a new paradigm of clinical thinking requires the flexibility to quickly modify data displays and services- more functionality
- Configure dynamically
- Respond to end user needs; better ‘ease of development”
- Retain conformance , performance and integrity
- Crosswalk and integration of IT into the medical delivery model

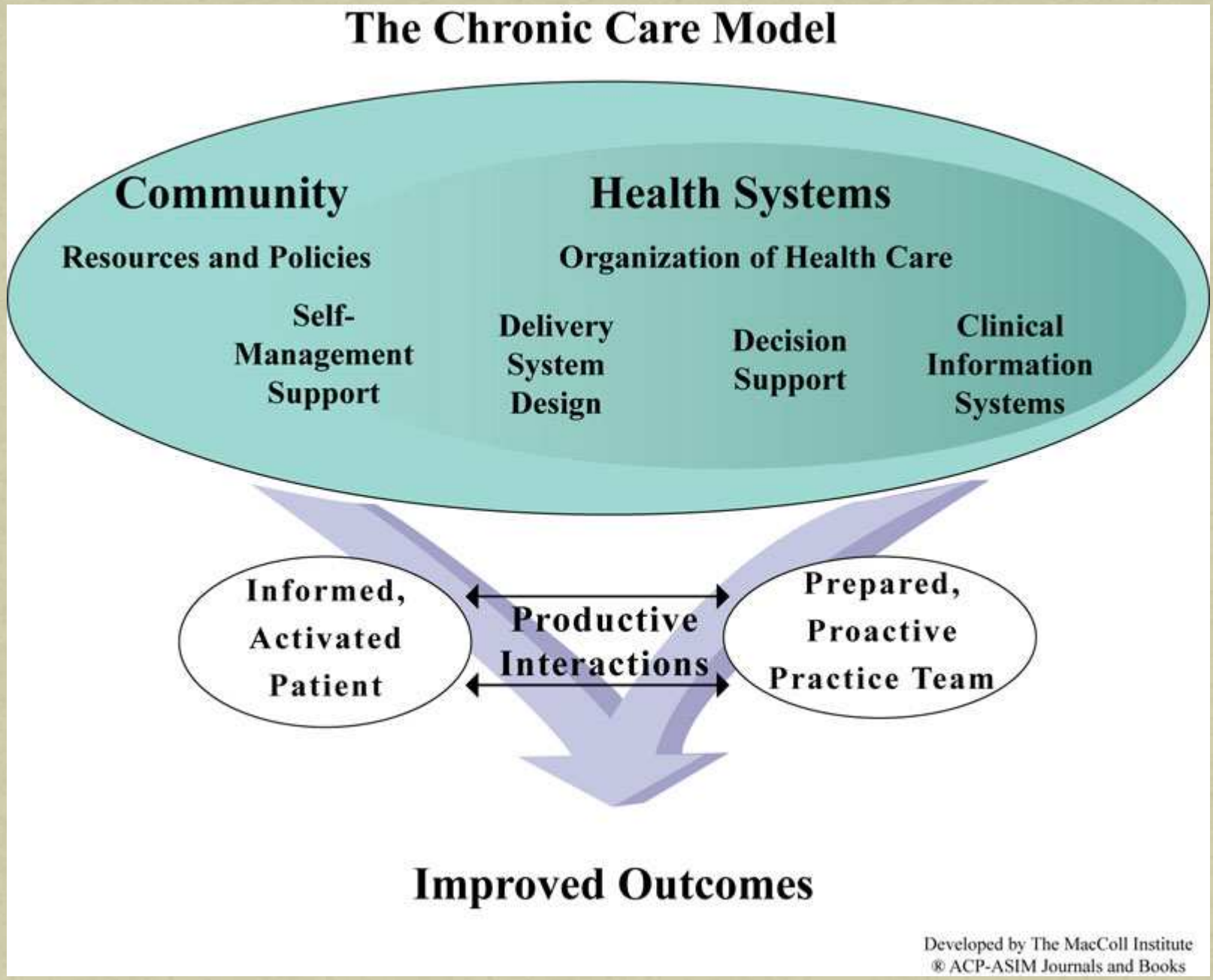
How do we move from here to there in a real world environment?

# Indian Health Service

- A comprehensive health service delivery system for approximately 1.9 million of the 3.3 million American Indians and Alaska Natives from 564 federally recognized tribes in 35 states

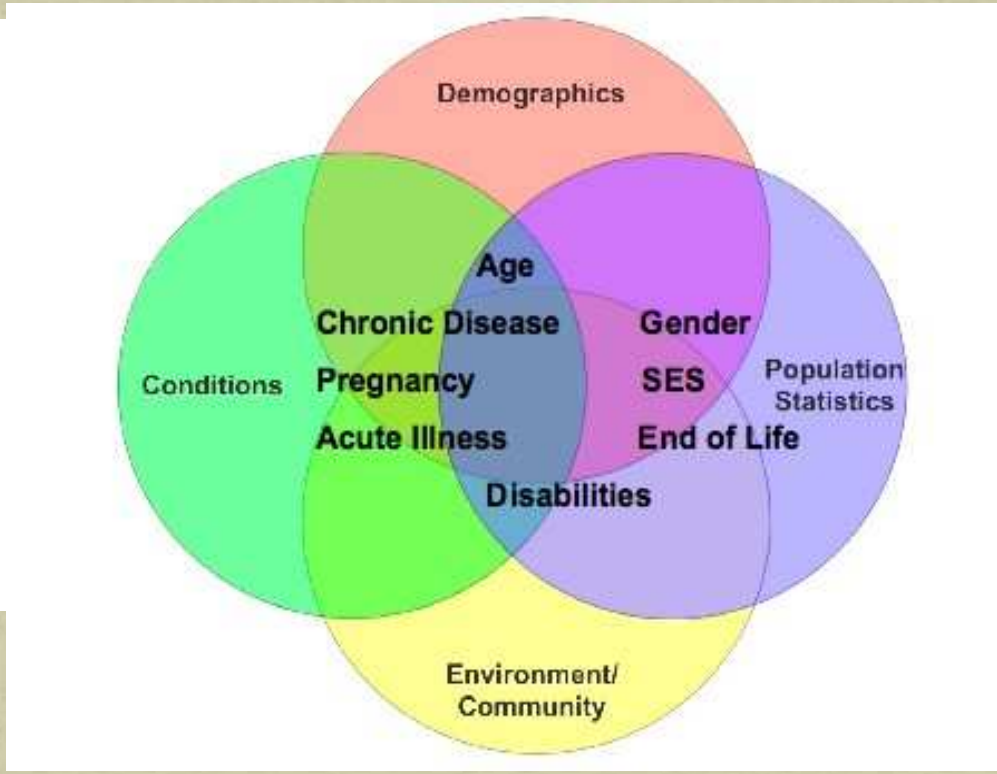
- Fiscal Year 2010 Appropriated Budget was $4.05 Billion

- Indian Health Service federal staff consists of over 15,000 employees, which includes approximately 2,700 nurses, 1000 providers, 600 pharmacists, and 300 dentists; tribally operated health facilities employ another 15,000


The Chronic Care Model
Community
Resources and Policies
Health Systems
Organization of Health Care
Self-Management Support
Delivery System Design
Decision Support
Clinical Information Systems
Informed, Activated Patient
Productive Interactions
Prepared, Proactive Practice Team
Improved Outcomes
Developed by The MacColl Institute
® ACP-ASIM Journals and Books

# A Broader Picture of Health

- Personal Health
- Family Health
- Community Health
- Public Health
- Population Health
- Transparency of Data




- Patient and community  sharing of information
- Commitment to Health Equity

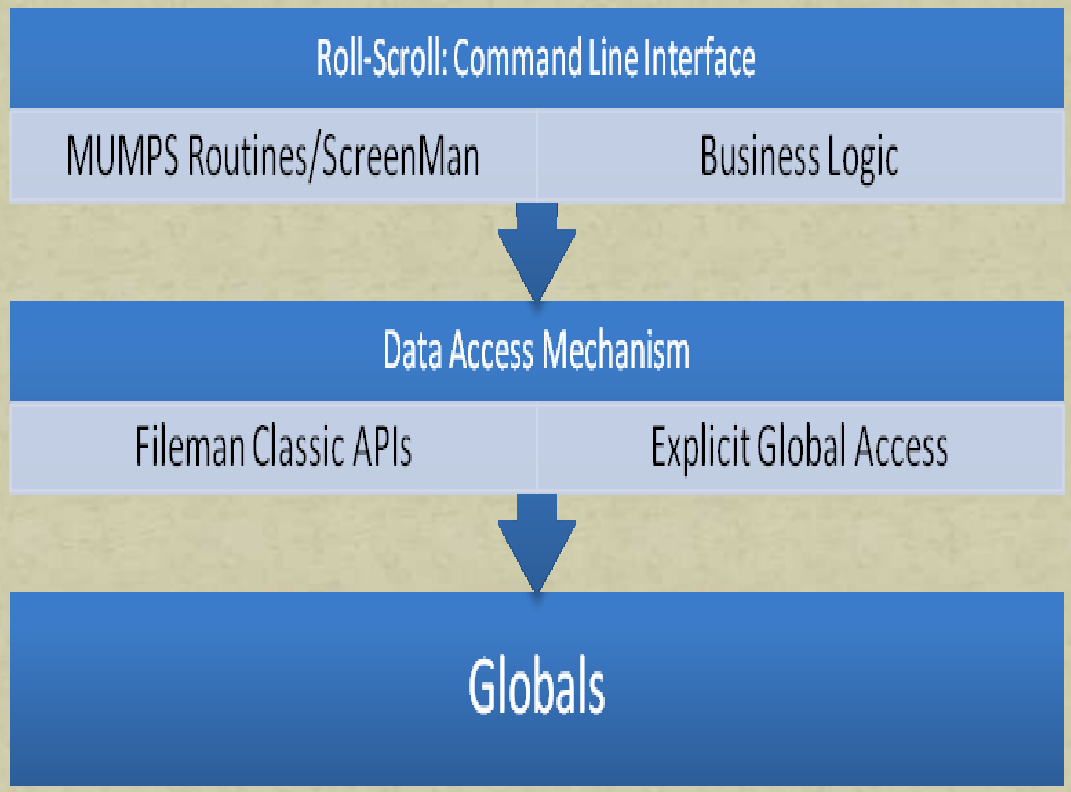
# IHS Health Information Technology

- Resource and Patient Management System (RPMS)
  - MUMPS-based, decentralized deployment, roll-n-scroll (Cache/Ensemble)
  - Suite of integrated/fragmented modules with confused metadata
  - **OVER TWENTY FIVE YEARS OLD**
- Electronic Health Record (EHR) – Graphical User Interface (GUI) – brings many functions to the provider in a convenient and user-friendly format
  - Modular display capability
  - Computer-based Provider Order Entry (CPOE)
  - Medications
  - Problem Lists
  - Lab Results
  - Allergies
  - Clinical Decision Support

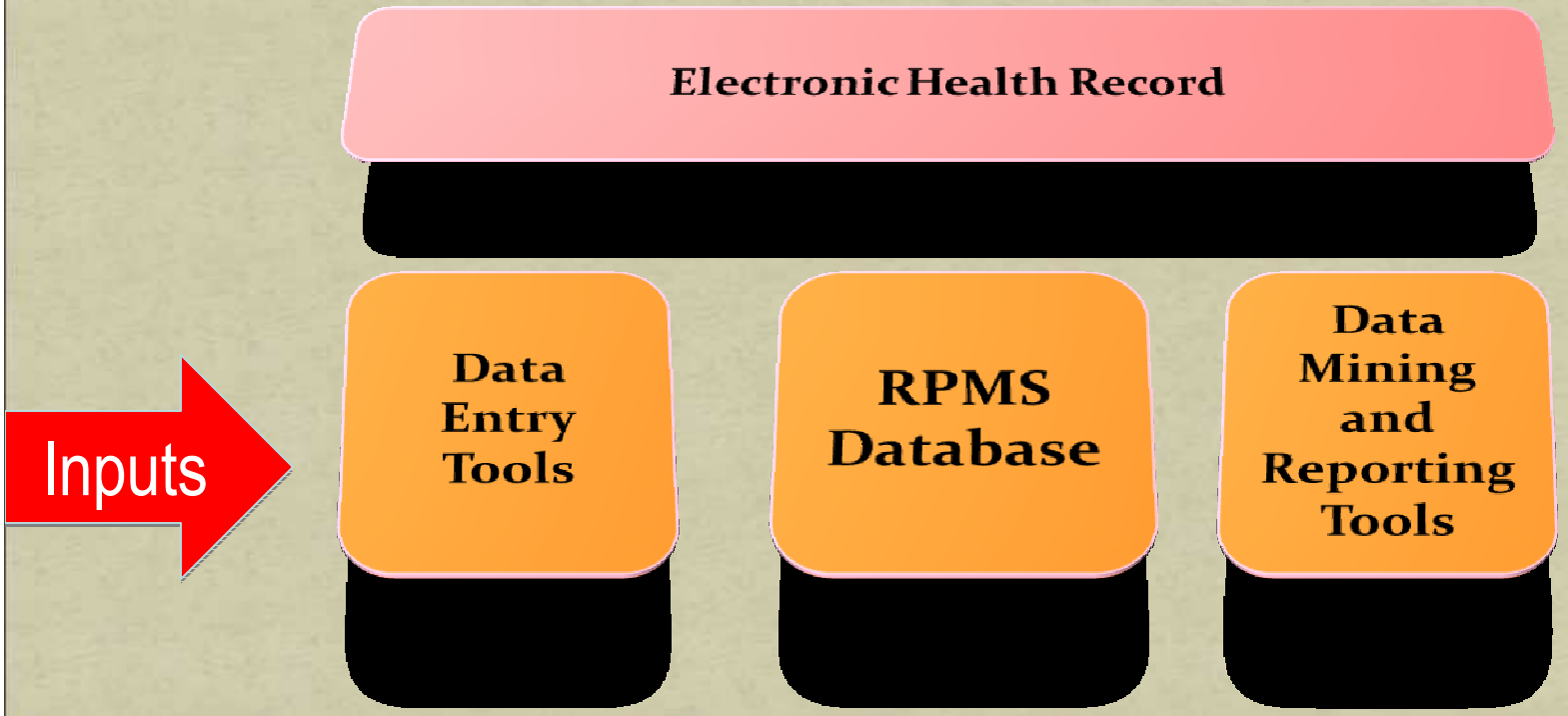
# IHS Health Information Technology what worked

- Traditional Delivery Model in RPMS modules
- iCare – Population Management Tool
- Care Management Event Tracking (CMET)
- Clinical Reporting System (e-Quality for pt and pop)
- Patient Wellness Handout
- Health Information Exchange
  - Influenza-Like Illness (ILL)
  - Immunizations
  - Patient Summary (soon)
  - Community Alerts National Epidemiological Surveillance (CANES)
- National Patient Information and Reporting System (NPIRS) – data warehouse
- Personal Health Record

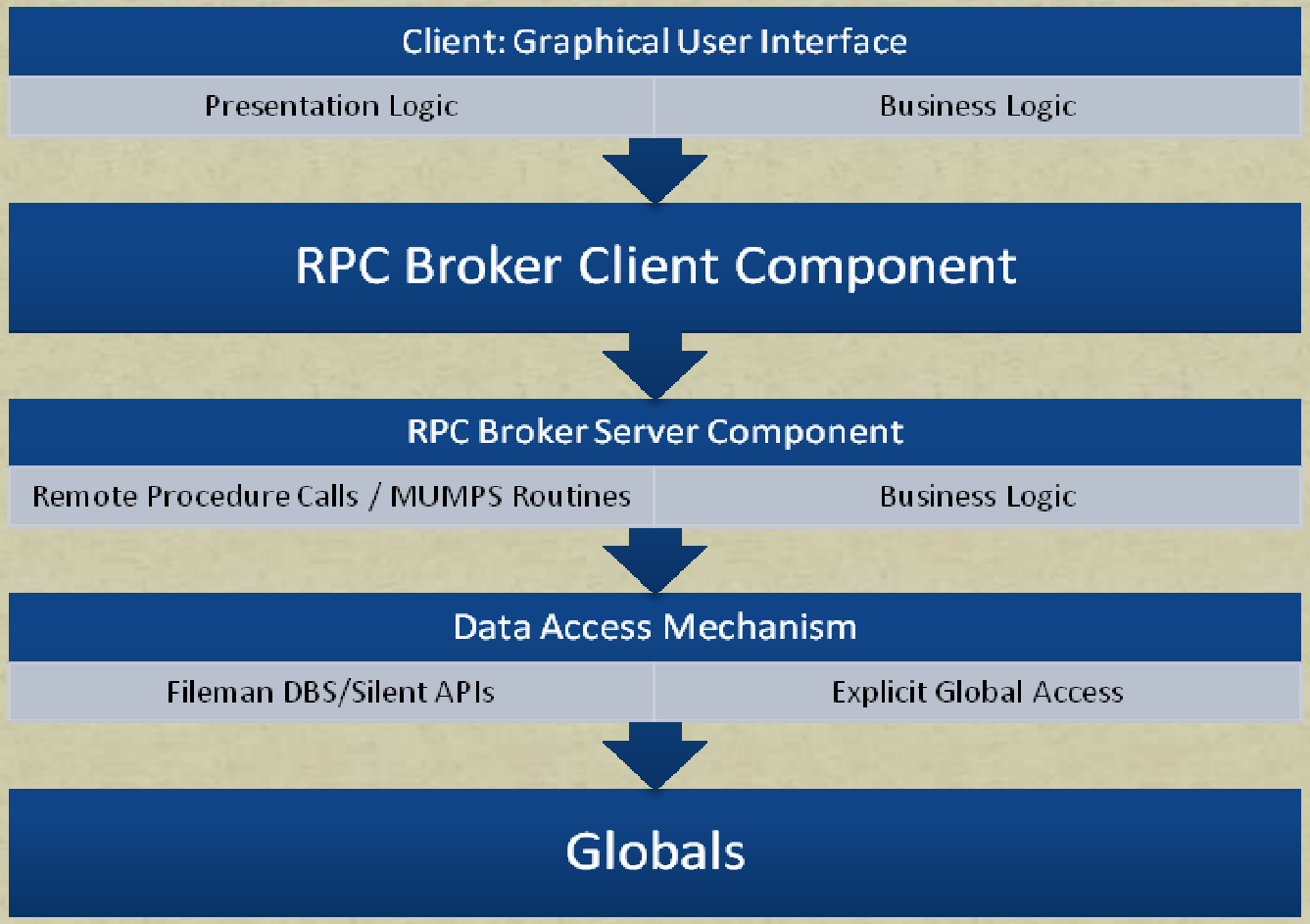
# RPMS Legacy Roll and Scroll Modules



# RPMS Electronic Health Record Pre SOA



# RPMS Legacy Desk Top Applications



# What made RPMS work?

- File structure designed to support standard care delivery model
  - Application model consistent with VISTA
  - Addition of equivalent of HDR files in the back end
  - What needs to be exposed in the data layer?
  - Evaluation of the V Pharmacy File/ Pharmacy Module
    - Pharmacy module file more robust than V ( visit) pharmacy file
    - Over 100 fields
    - Less than 10% used over 95% in the V file
    - More data fields populated in the pharmacy package
- Facilitated development of structured as well as ad hoc queries
- Recognition of additional domains and applications to support population and public health
- How do we get to the next stage?
  - Who needs what /where do they need it/ why do they need it
  - How do we get to 'services'?
  - Are there interim steps that we take to 'get there'?

# What SOA may require

- Defined benefits
- Affordable
- Commitment to transition plan
- Enterprise architecture integration
- Federated Database system
- Interoperability

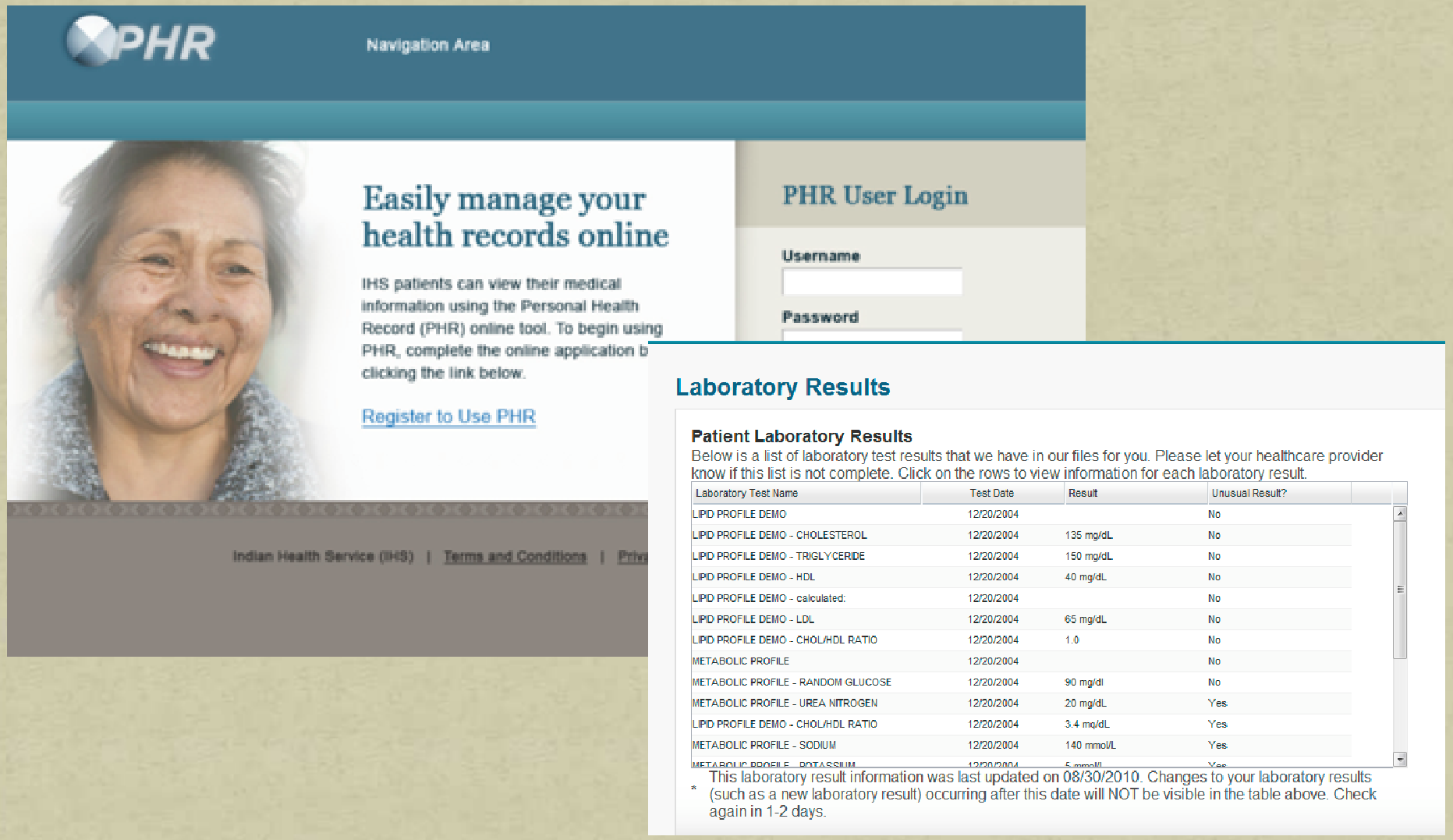
# SOA at IHS

- IHS has some SOA (can you have some SOA??)
  - SOA has been most effective for IHS where the systems interact with each other
  - Personal Health Record (PHR) (screen shots follow)
  - Health Information Exchange functions
- IHS is evaluating more SOA
  - The concept of services fits the modularity of RPMS and functions of health care delivery
  - Network bandwidth and information exchange capabilities are starting to be in place to support SOA
  - SOA has open source technologies
  - Extensibility, sustainability

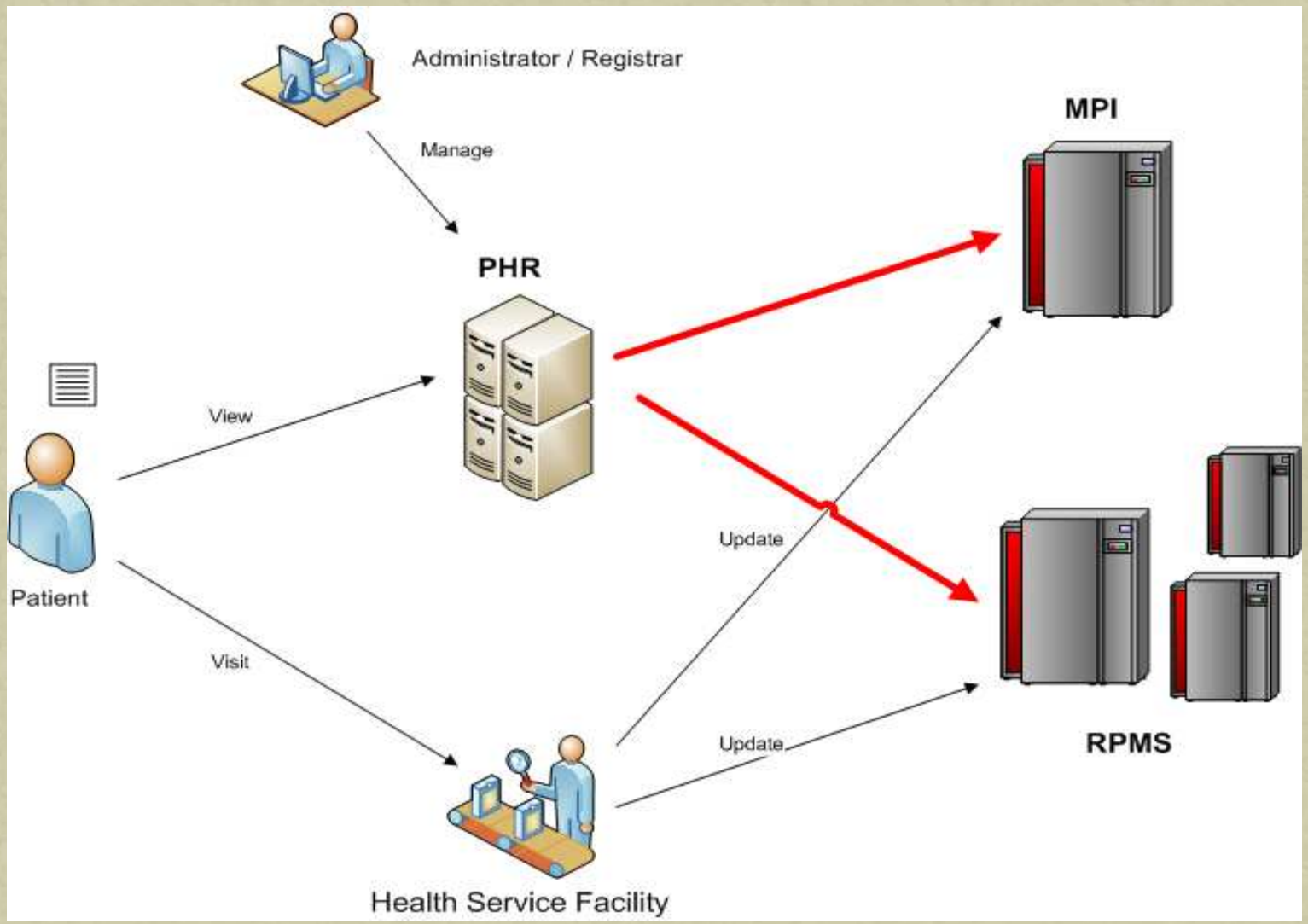
# SOA at IHS (cont'd)

- Challenges to SOA
  - Insufficient network bandwidth in many IHS and Tribal locations
    - The Federal Communications Commission's National Broadband Plan estimated that only 8% of IHS and Tribal sites have sufficient broadband capacity for health IT
  - Limited funding for new innovation so looking to reuse where possible
  - Trade-off between open-source modularization and effective control of the existing infrastructure

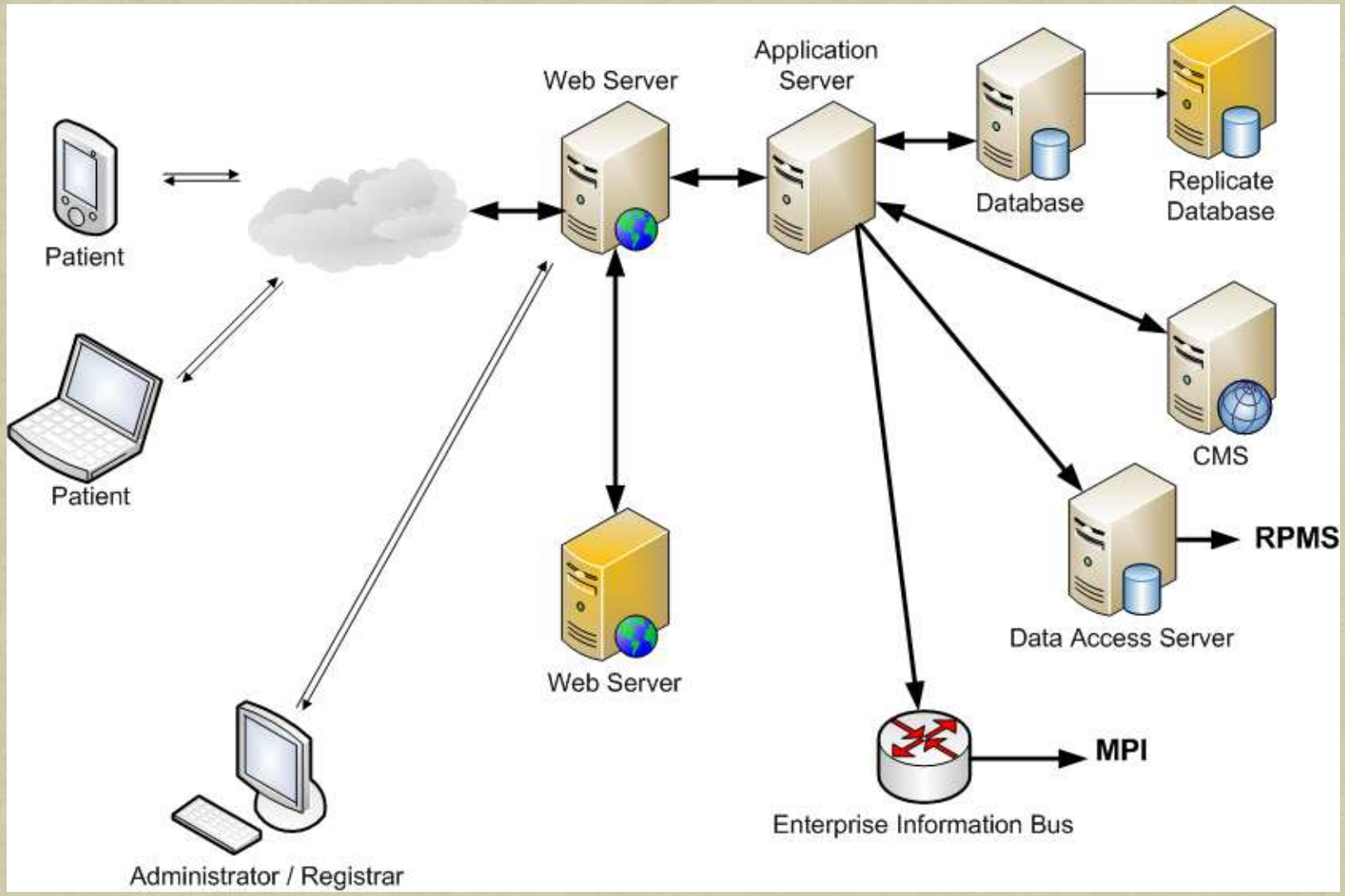
# PERSONAL HEALTH RECORD



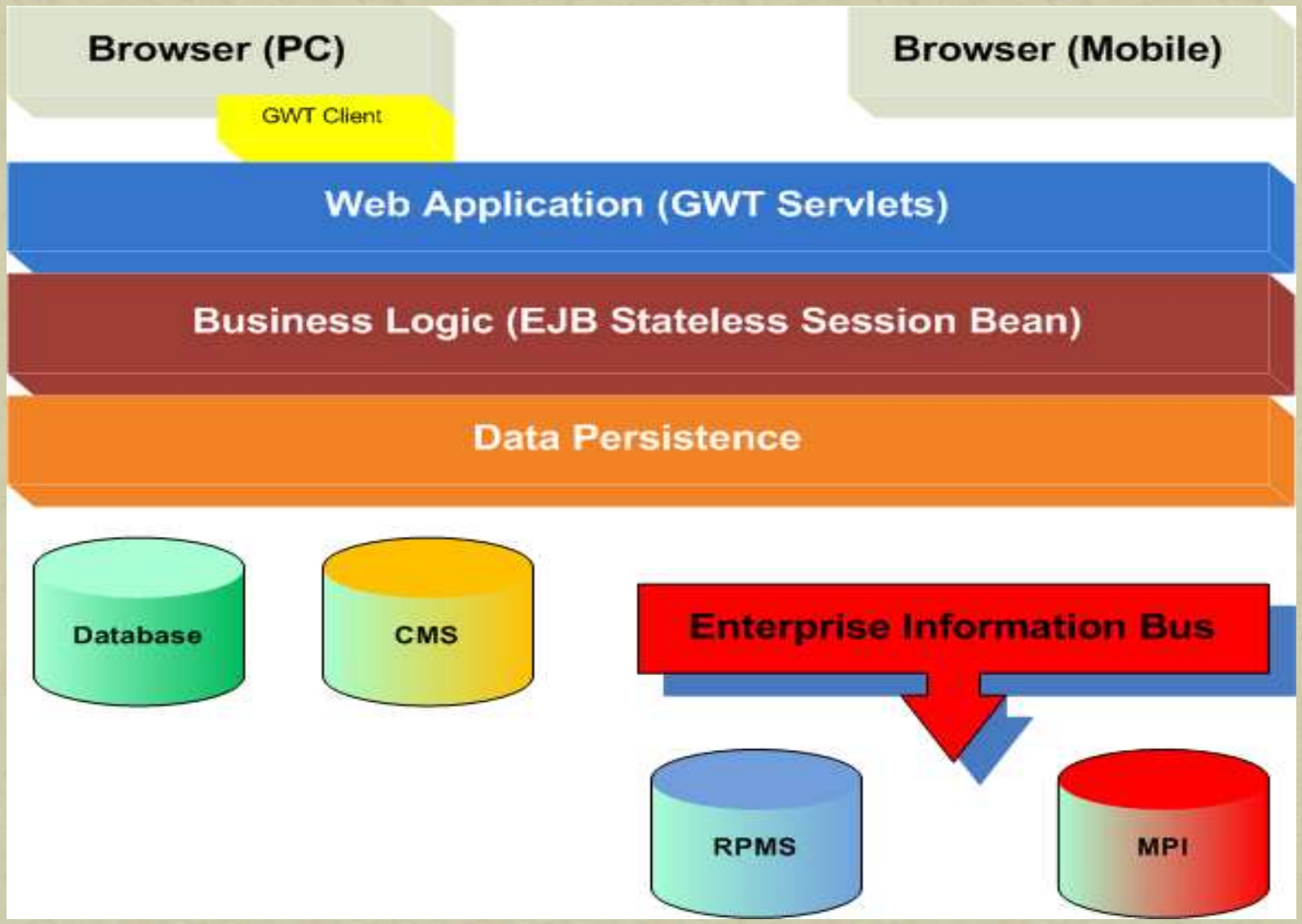
# PHR Conceptual Model



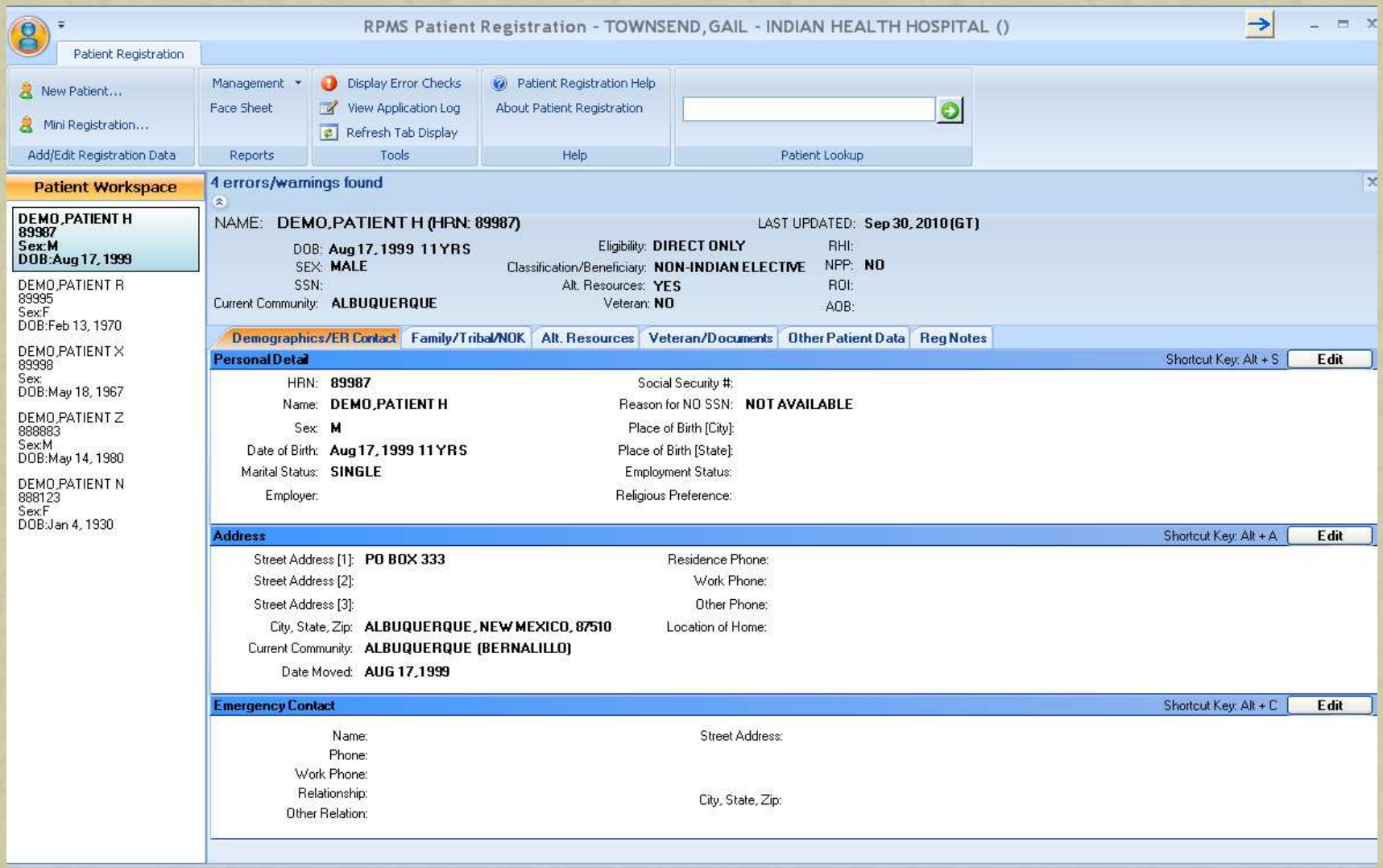
# PHR Deployment Model



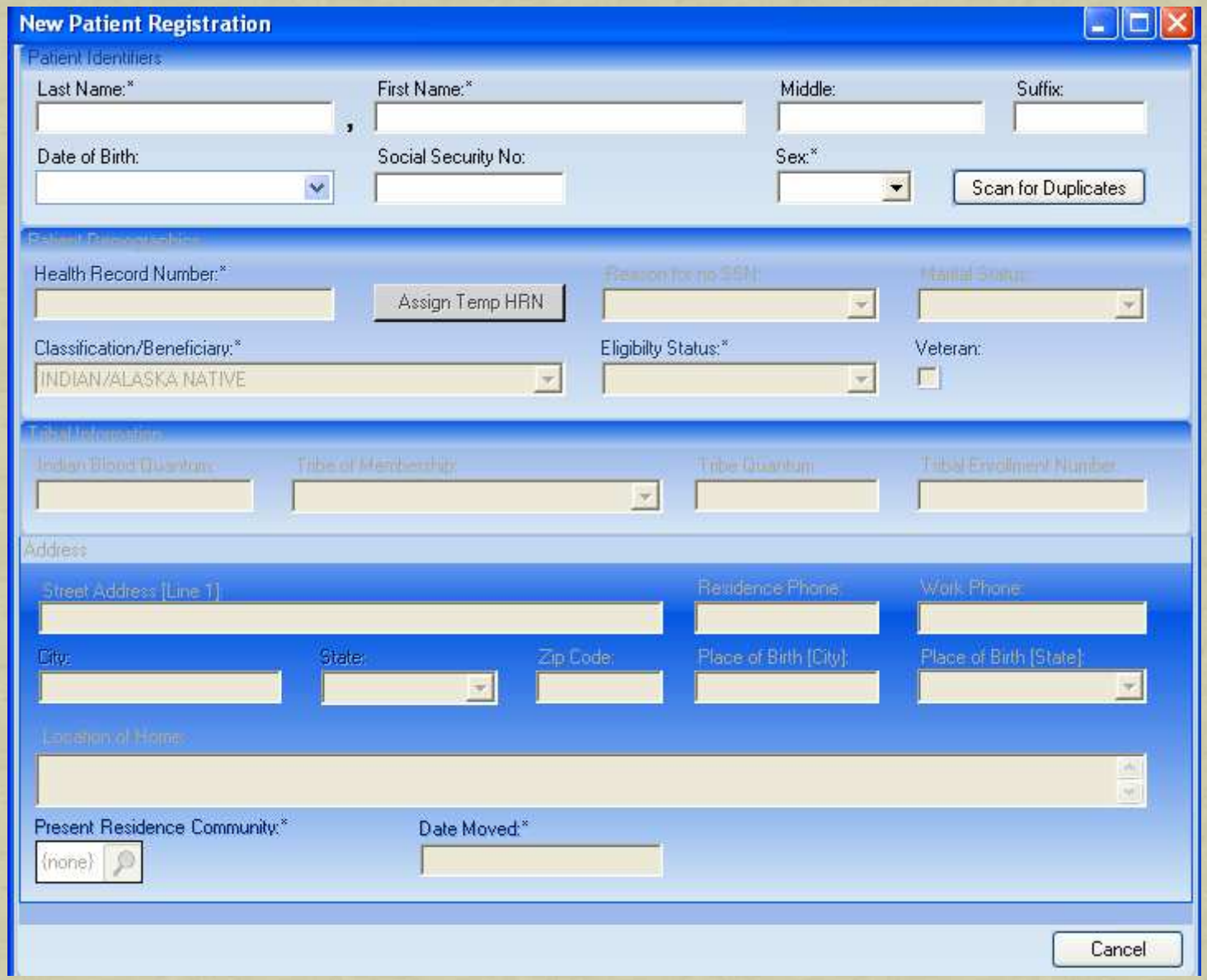
# PHR Application Layer



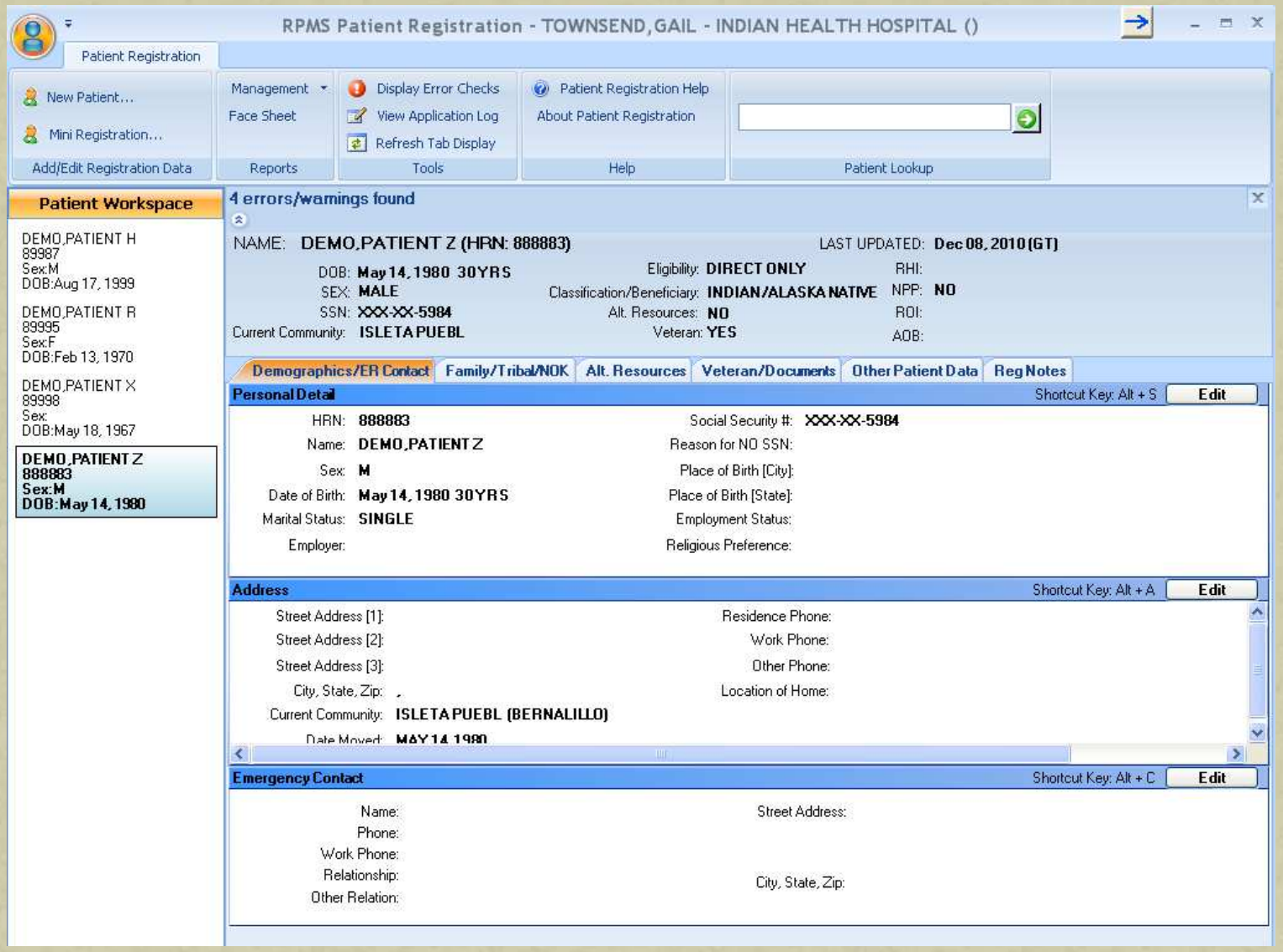
# Still Client –Server
# Patient Registration-Main View



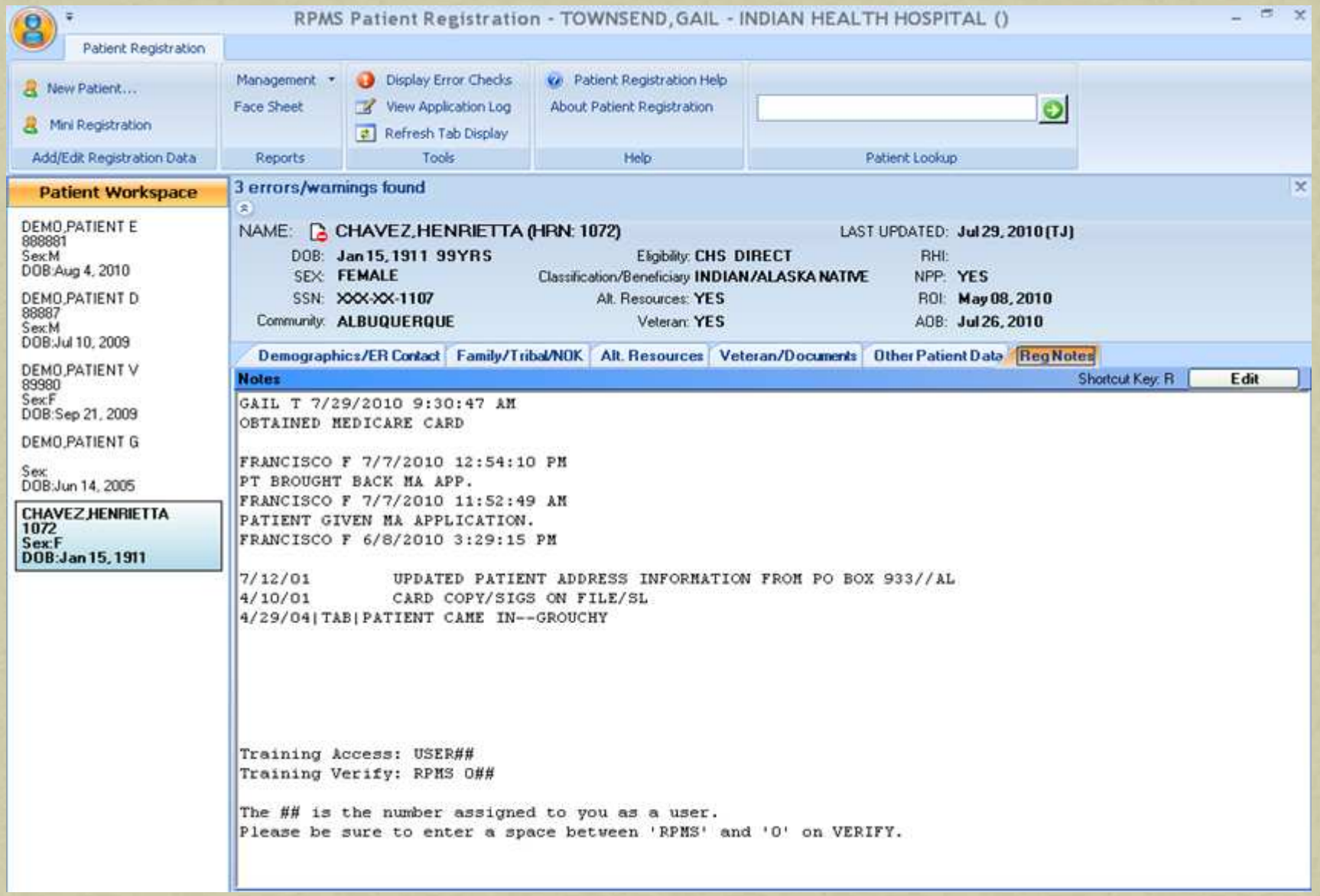
# Add New patient screen



# Demographics/ER contact Tab



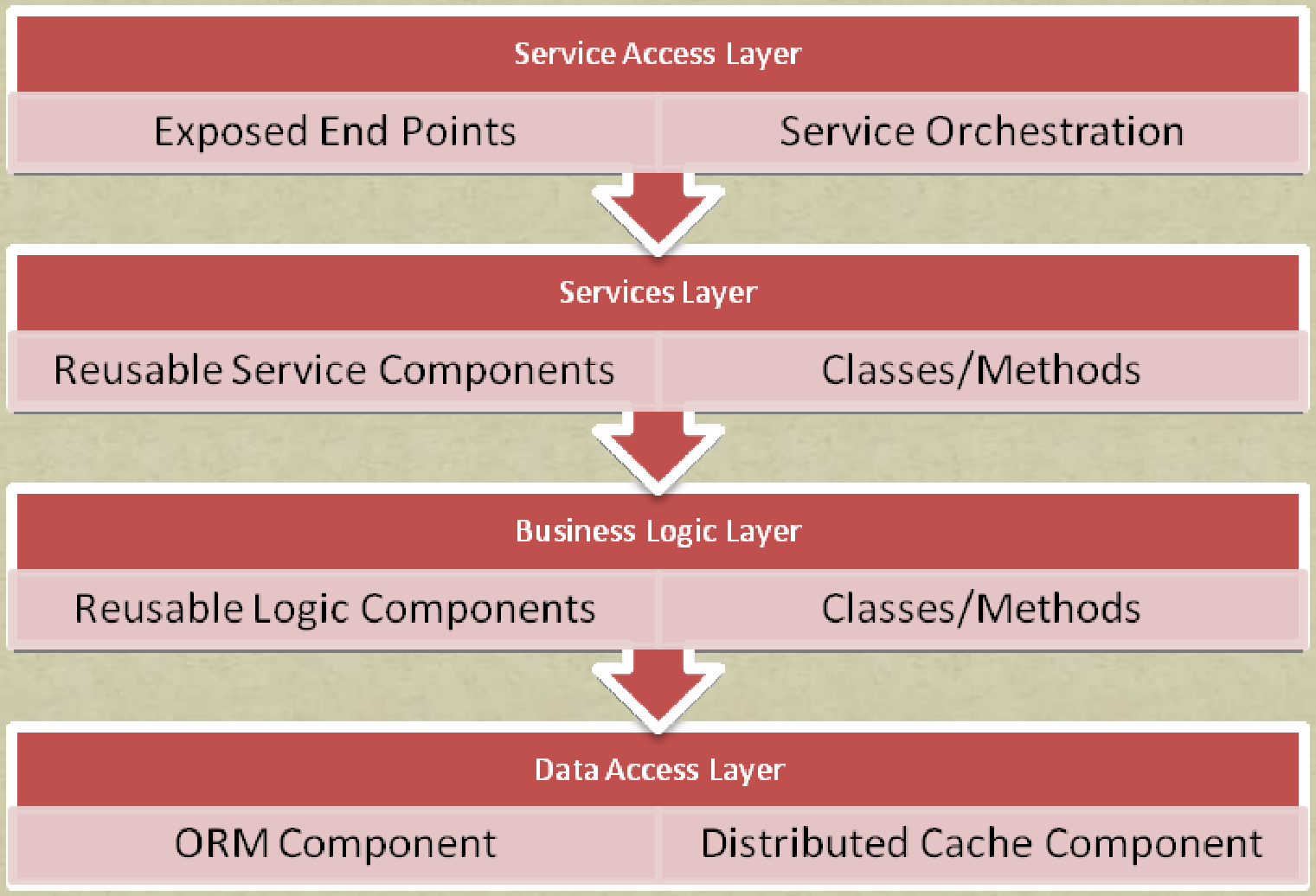
# Registration Notes Tab



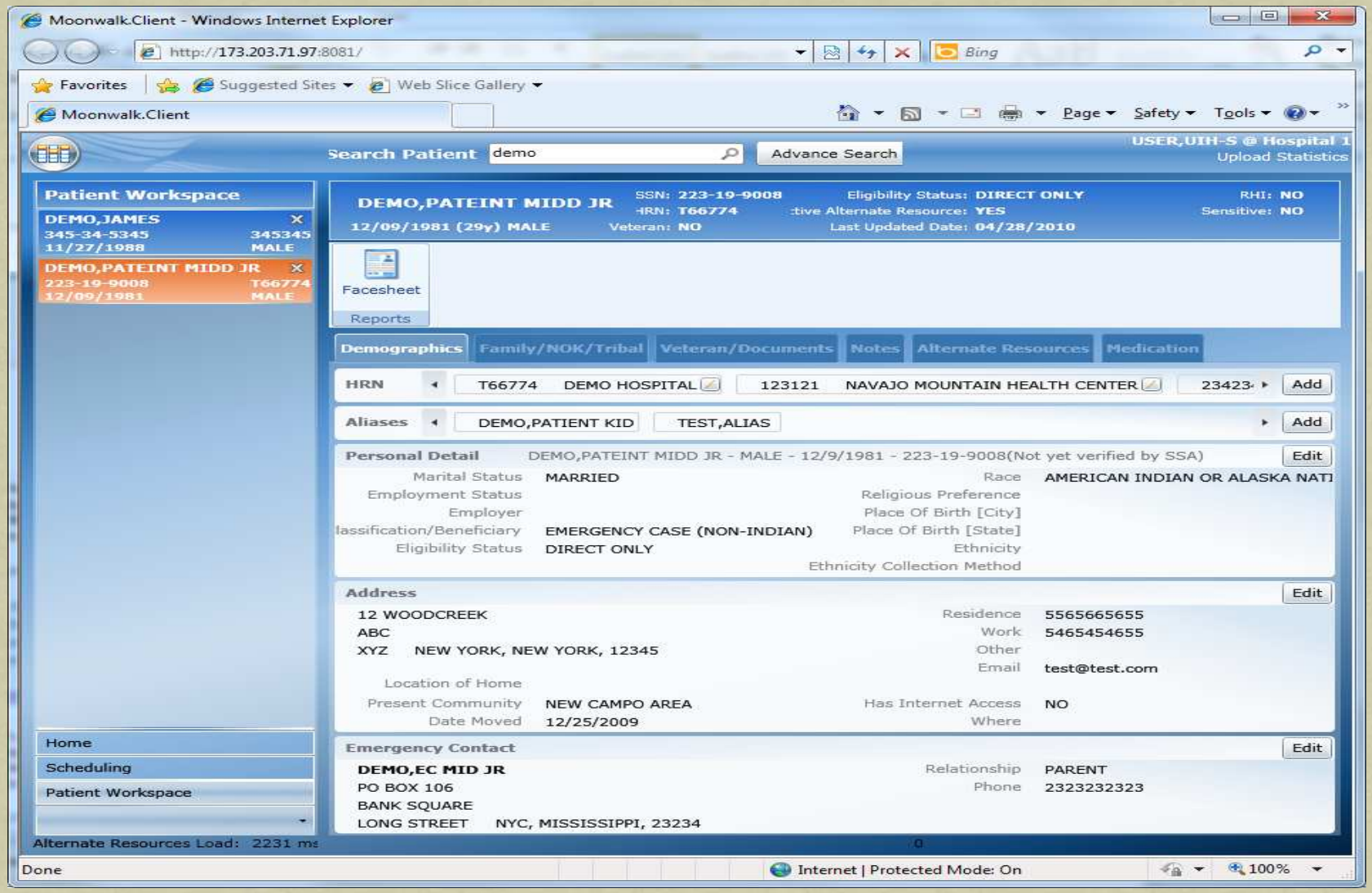
# Looking to the Future

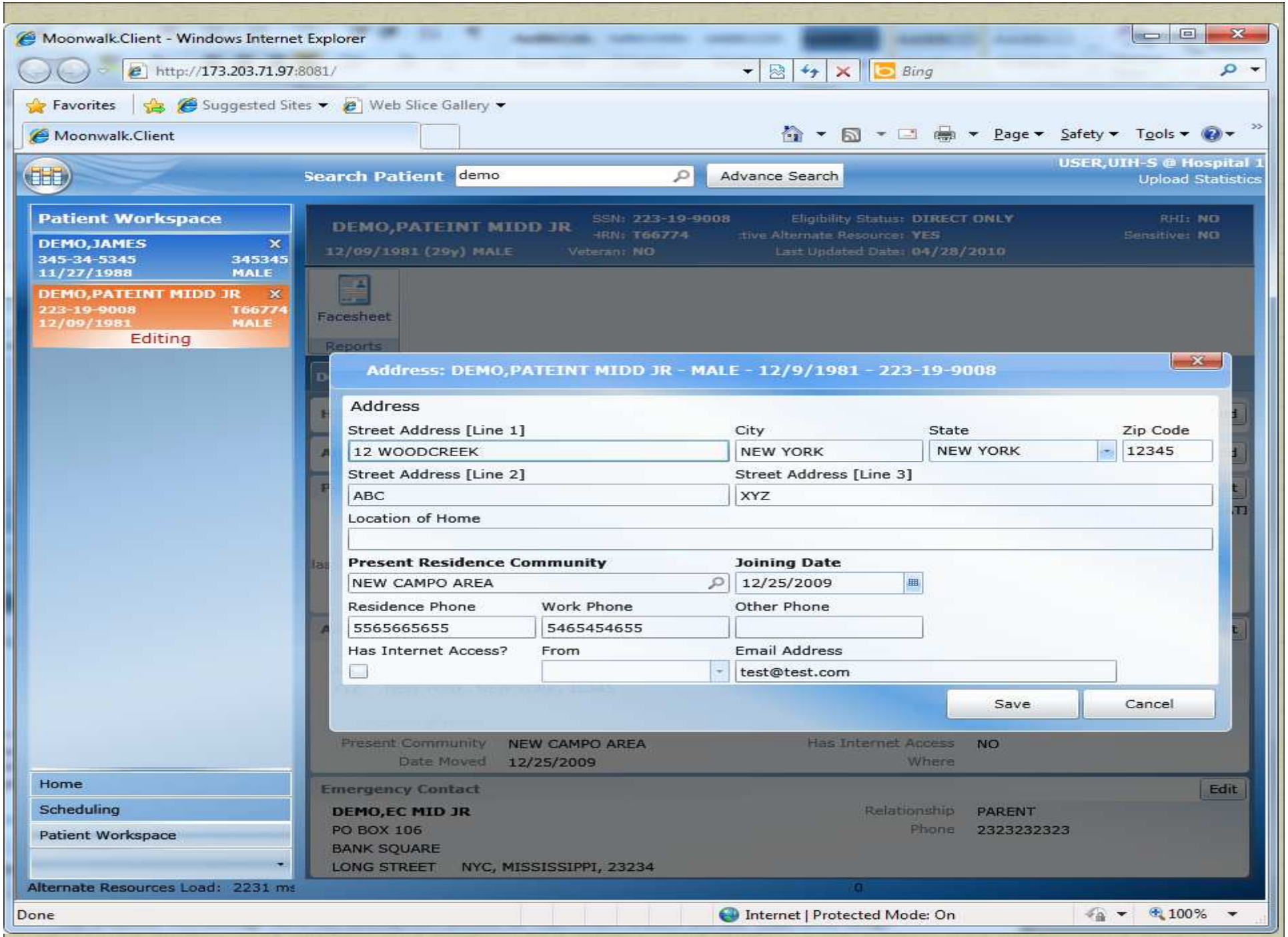
- IHS is looking at the next version of EHR
  - Reviewing policies and procedures to enable and sustain SOA
  - Reviewing middleware needs to enable SOA
  - Reducing duplicative coding in various modules
  - Centralized APIs ( does that work?)
  - Plan to use Cache objects to make RPMS SQL compliant with associated web services to support interoperability initiatives and application interfaces
  - Integrate SOA into the Master Patient Index, the Nationwide Health Information Network gateway, and Practice Management applications
- More requirements for meaningful use and health information exchange

# One Option for the Future



# SOA Pilot - Practice Management




Moonwalk.Client - Windows Internet Explorer
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Bing
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Moonwalk.Client
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Safety
Tools
Search Patient
demo
Advance Search
USER,UIH-S @ Hospital 1
Upload Statistics
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State
NEW YORK
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Joining Date
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Has Internet Access?
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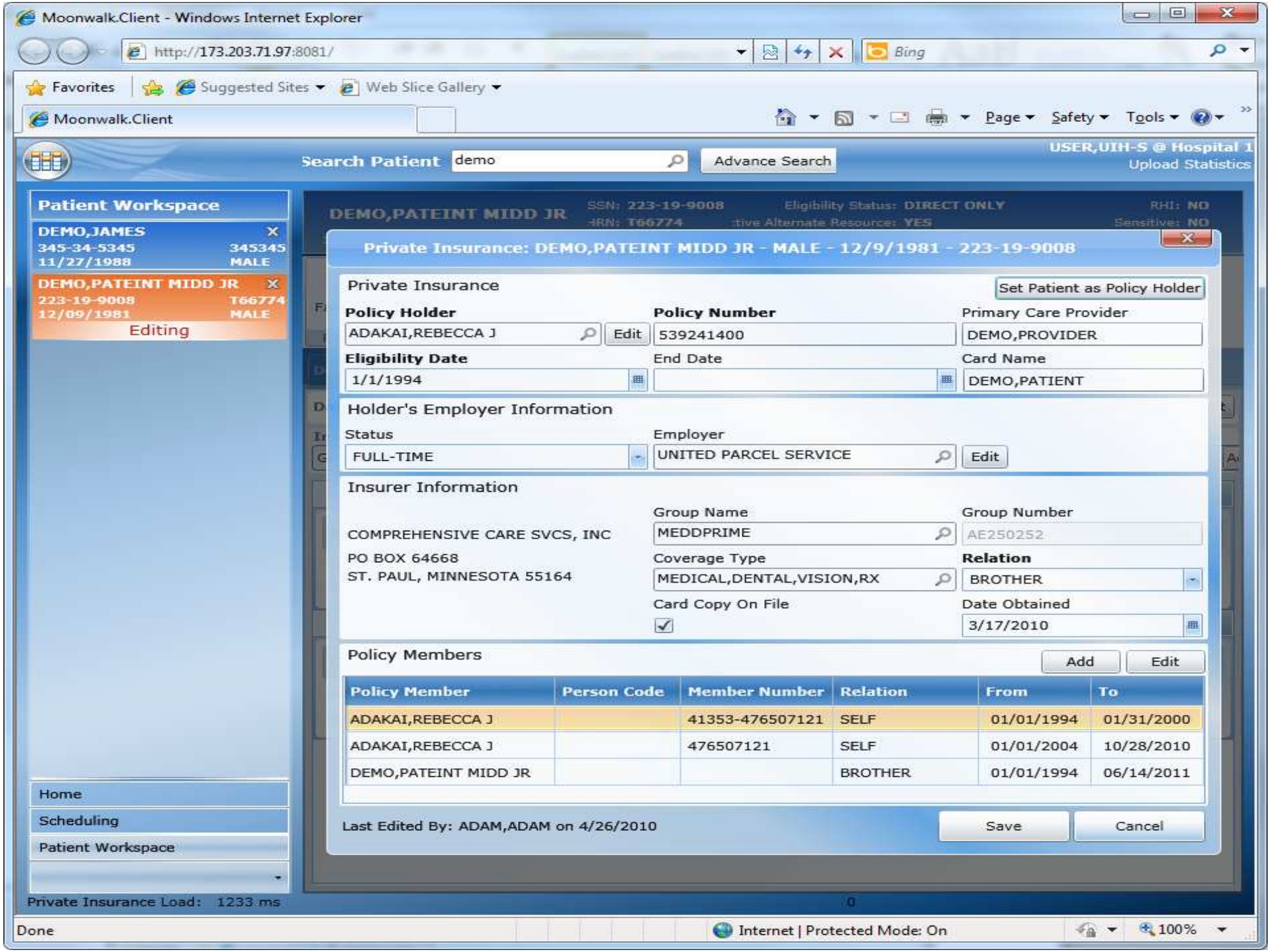
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Eligibility Date
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End Date
Card Name
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Holder's Employer Information
Status
FULL-TIME
Employer
UNITED PARCEL SERVICE
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COMPREHENSIVE CARE SVCS, INC
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ST. PAUL, MINNESOTA 55164
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# Open Source at IHS

- IHS has committed to open source
  - RPMS continues to collaborate with the VA on software development
  - RPMS used by the Community Health Network of West Virginia in ambulatory clinics and facilities supported by the University of Hawaii
  - RPMS is available for download, although the MUMPS used requires a license
  - Discussions of enhancements to RPMS consider impacts to users of the open source RPMS
  - Integrating open source technologies is a priority

Questions?

Contact:

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# Meaningful Use of an EHR

- Incentives for the "meaningful use" of an EHR
  - Functional/HIT measures such as:
    - health information exchange
    - patient access to electronic health information
    - computer-based provider order entry
  - Clinical measures such as:
    - Hypertension: Blood Pressure Measurement
    - Preventive Care and Screening Measure Pair: a) Tobacco Use Assessment, b) Tobacco Cessation Intervention
    - Adult Weight Screening and Follow-up
  - IHS is currently certifying RPMS EHR for meaningful use

# Interoperability of EHRs

- Meaningful Use and Certification Standards require health information exchange (HIE) from the certified EHR
  - Must have standards for interoperability
  - Nationwide Health Information Network (NHIN - collection of standards, protocols, legal agreements, specifications and services to enable secure HIE)
    - The IHS is creating an NHIN interface using the Federal Health Architecture CONNECT gateway
  - The IHS is in the process of creating an HL7 CCD that will be extracted from RPMS