Distributed Decision Support Services
&
Knowledge Management Repository
(KMR-II)

A Knowledge Management Architecture For Healthcare

Naval Health Research Center

San Diego, CA

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Disclaimer

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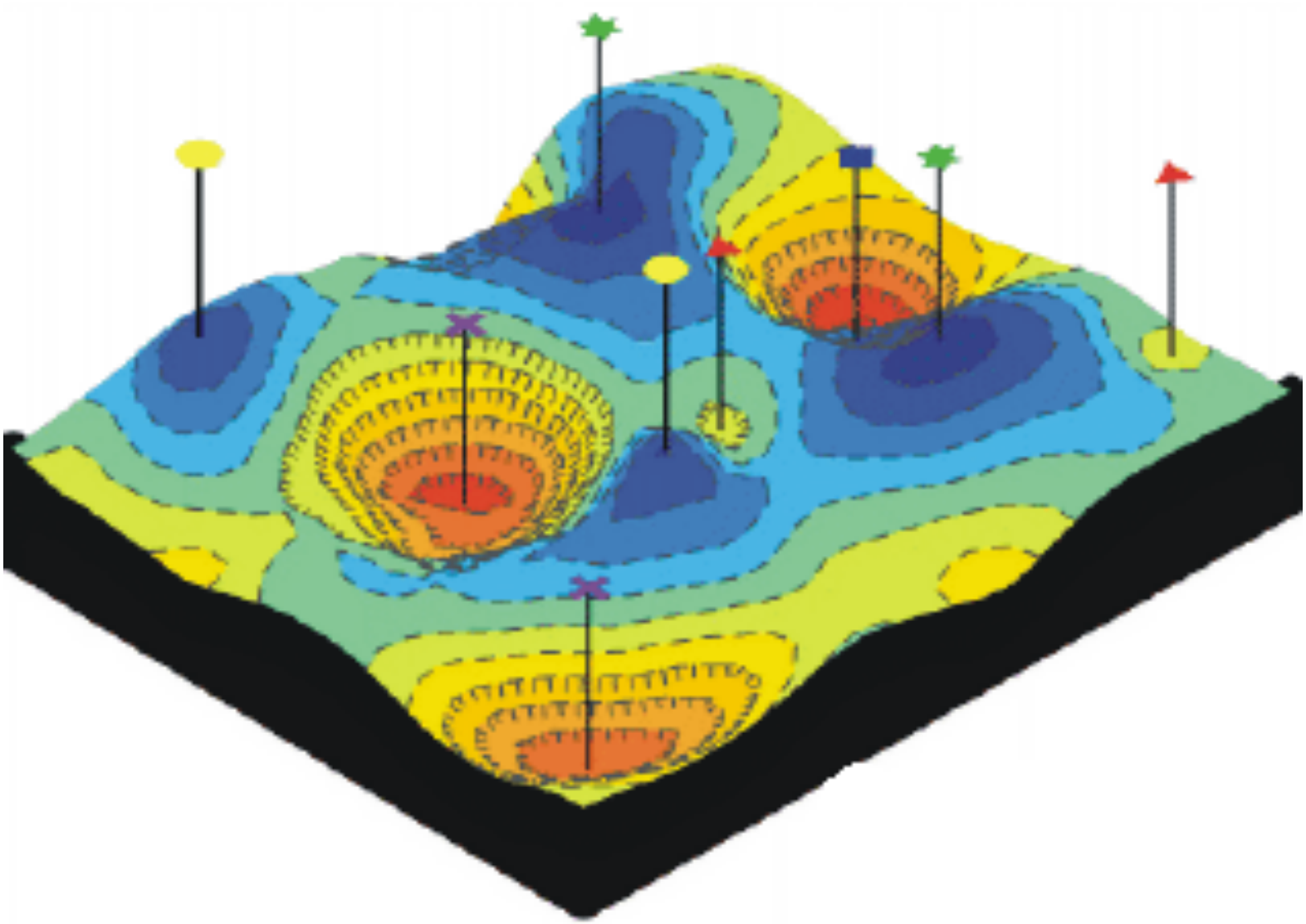
Cognitive Environment

Healthcare is a knowledge management challenge

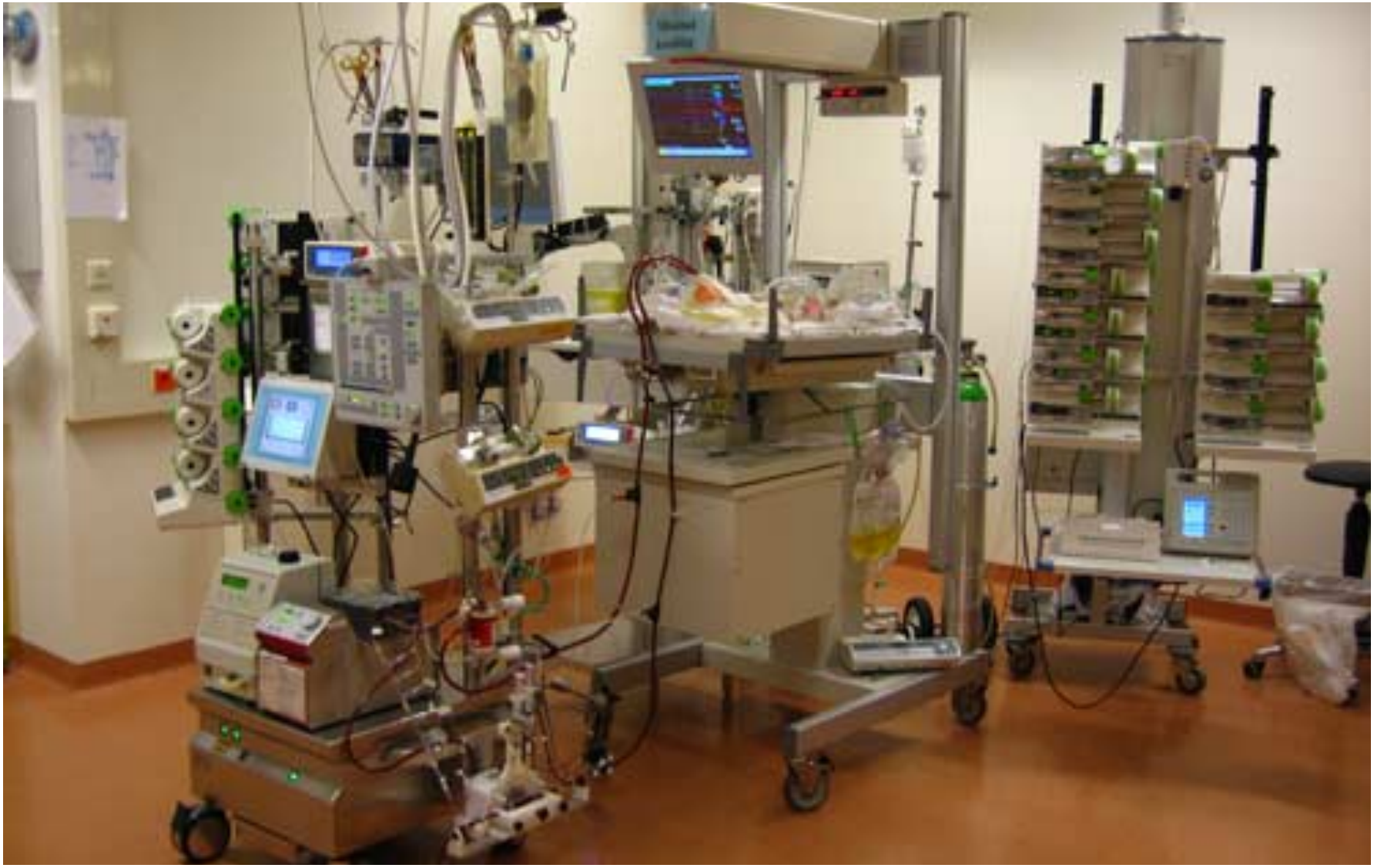
- Data / information
- Regulations
- Process orchestration
- Individualized care
- Education
- Access to care
- Patient-empowerment

- “Cognitive” technologies must integrate and support all these dimensions if quality care and desired behavior is to be achieved

Behavioral Entropy

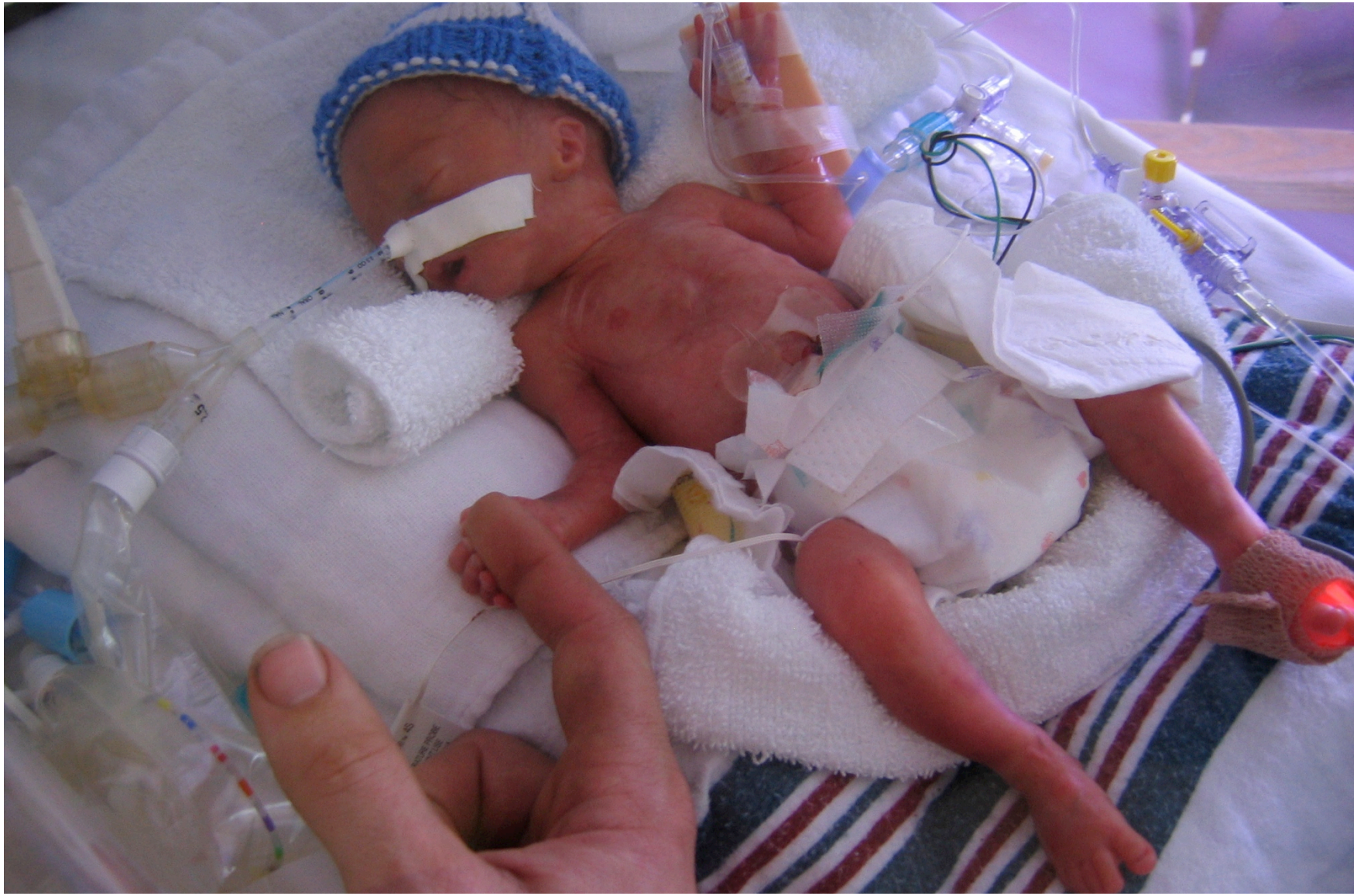


Will It Improve Outcomes?



They Earned It

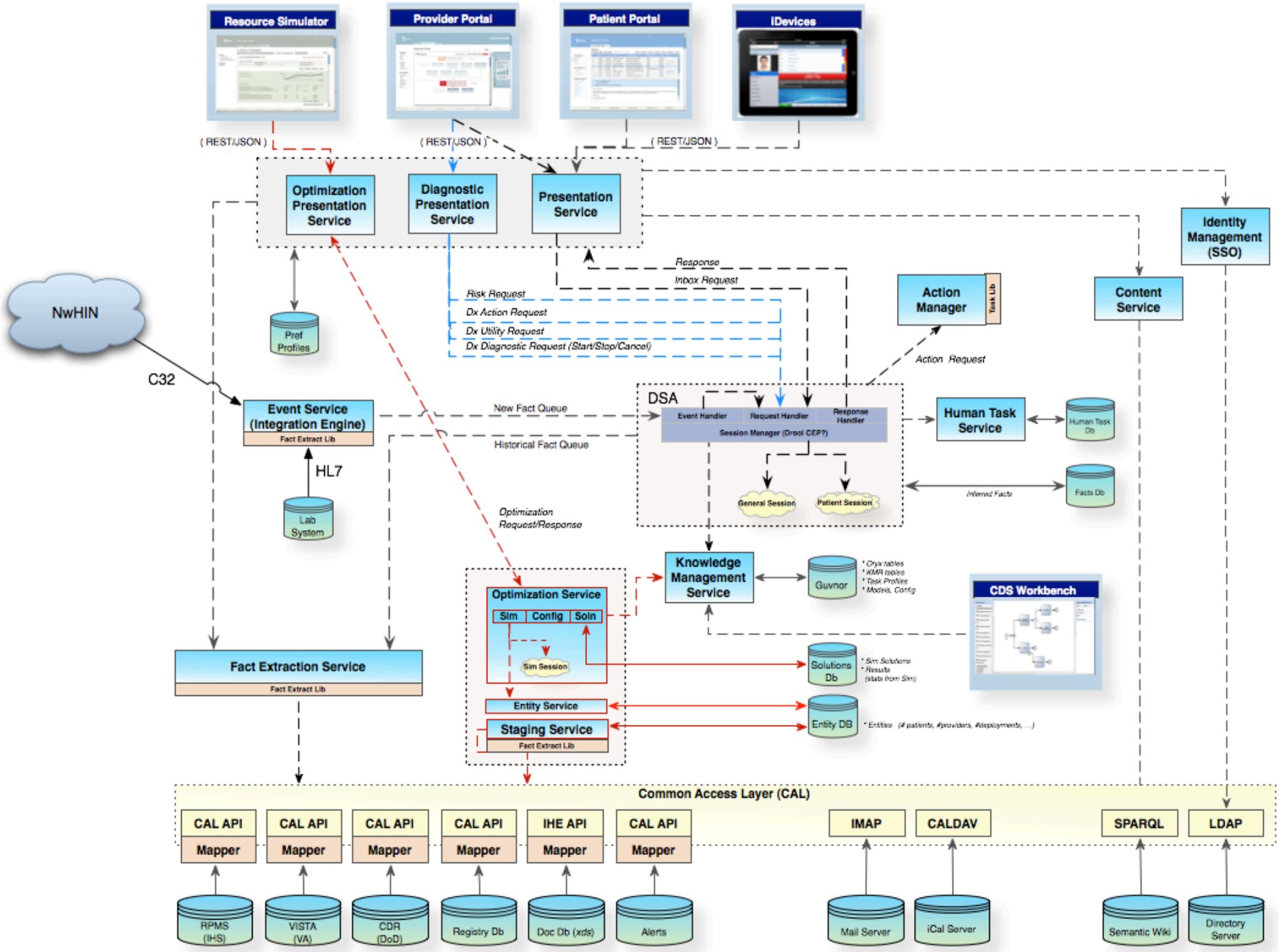
They Deserve It



DDSS-KMR Objectives

US Navy research effort to create a reference KNOWLEDGE MANAGEMENT architecture

- System should be able to provide “real-time” analysis
- System knowledge modules should be sharable between systems and organizations
- System should be able to request, receive, and process distributed data
- System should be able to leverage different inference capabilities as appropriate
- System should support generalized decision support for populations AND rules individualized for a specific patient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Diagnostic Presentation Service
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Doc Db (xds)
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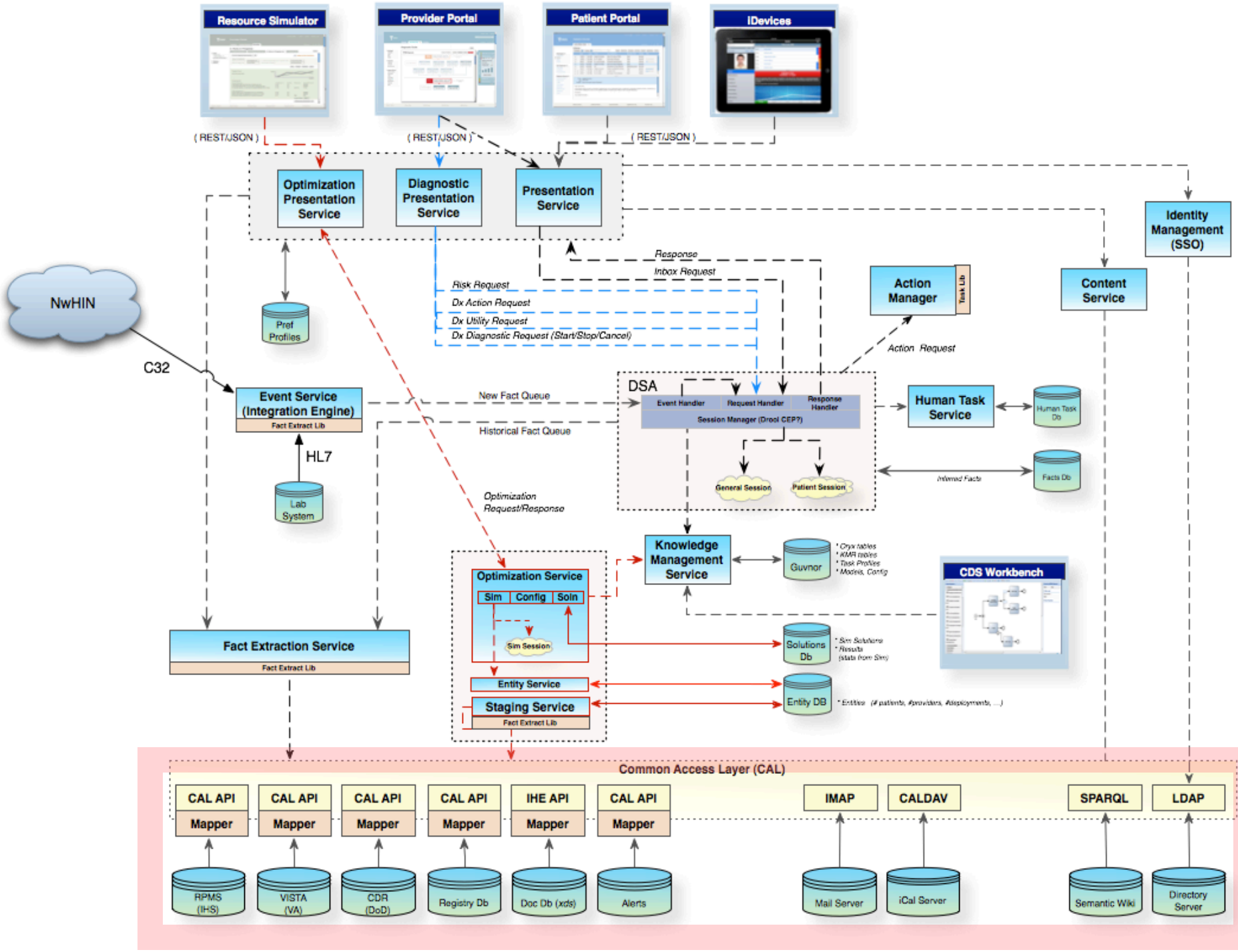
Mail Server
iCal Server
Semantic Wiki
Directory Server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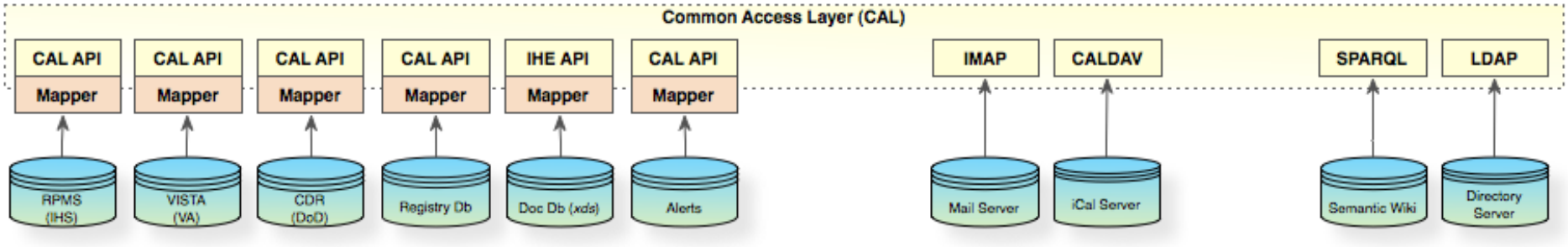

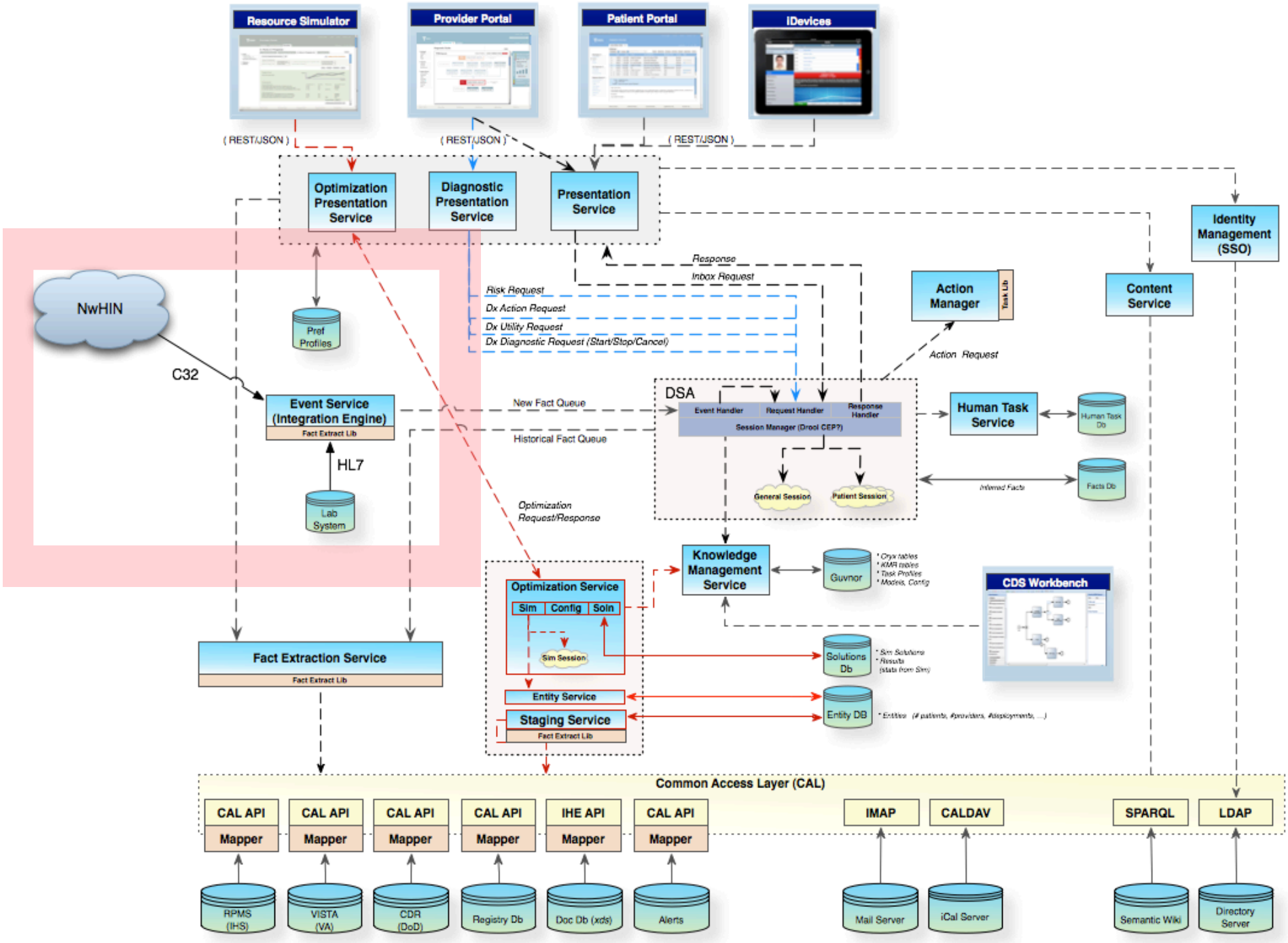
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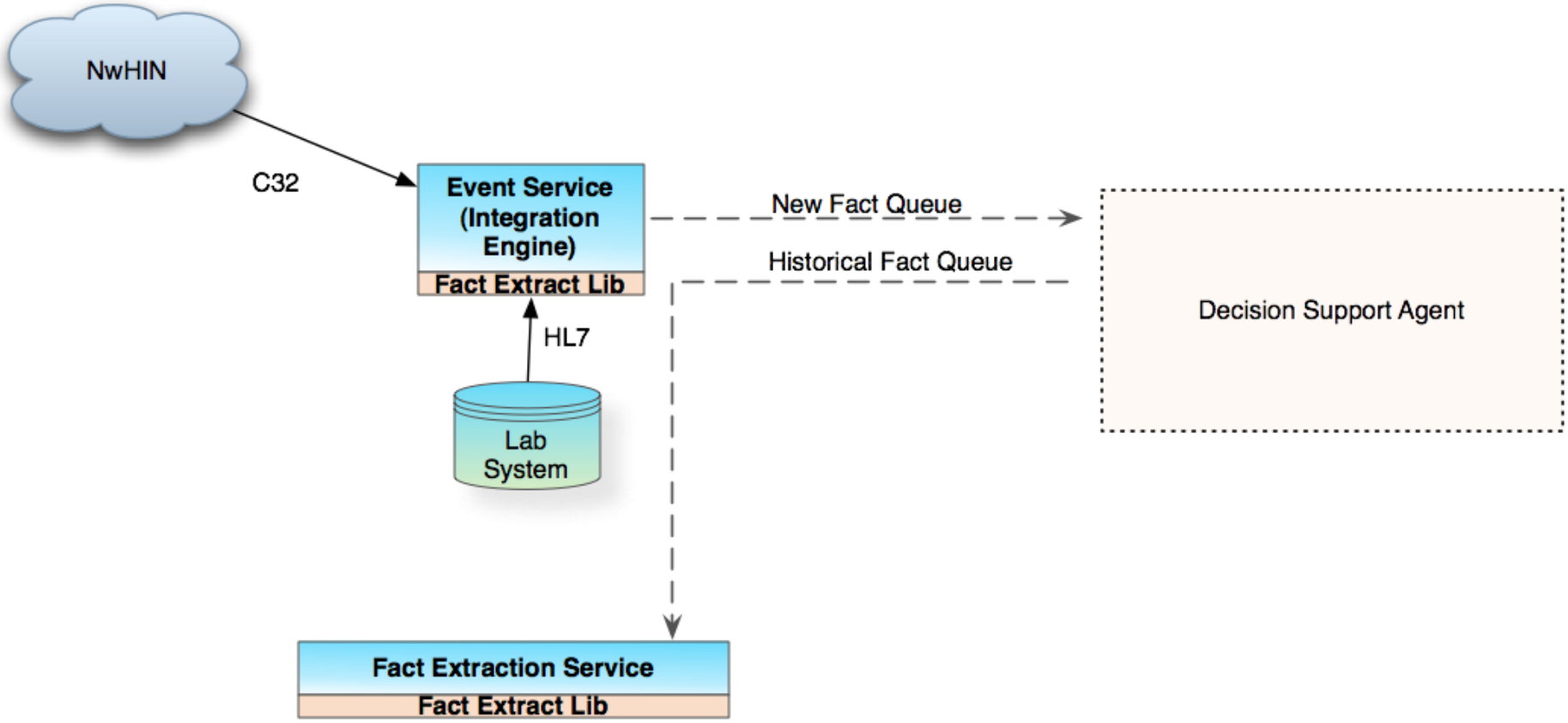

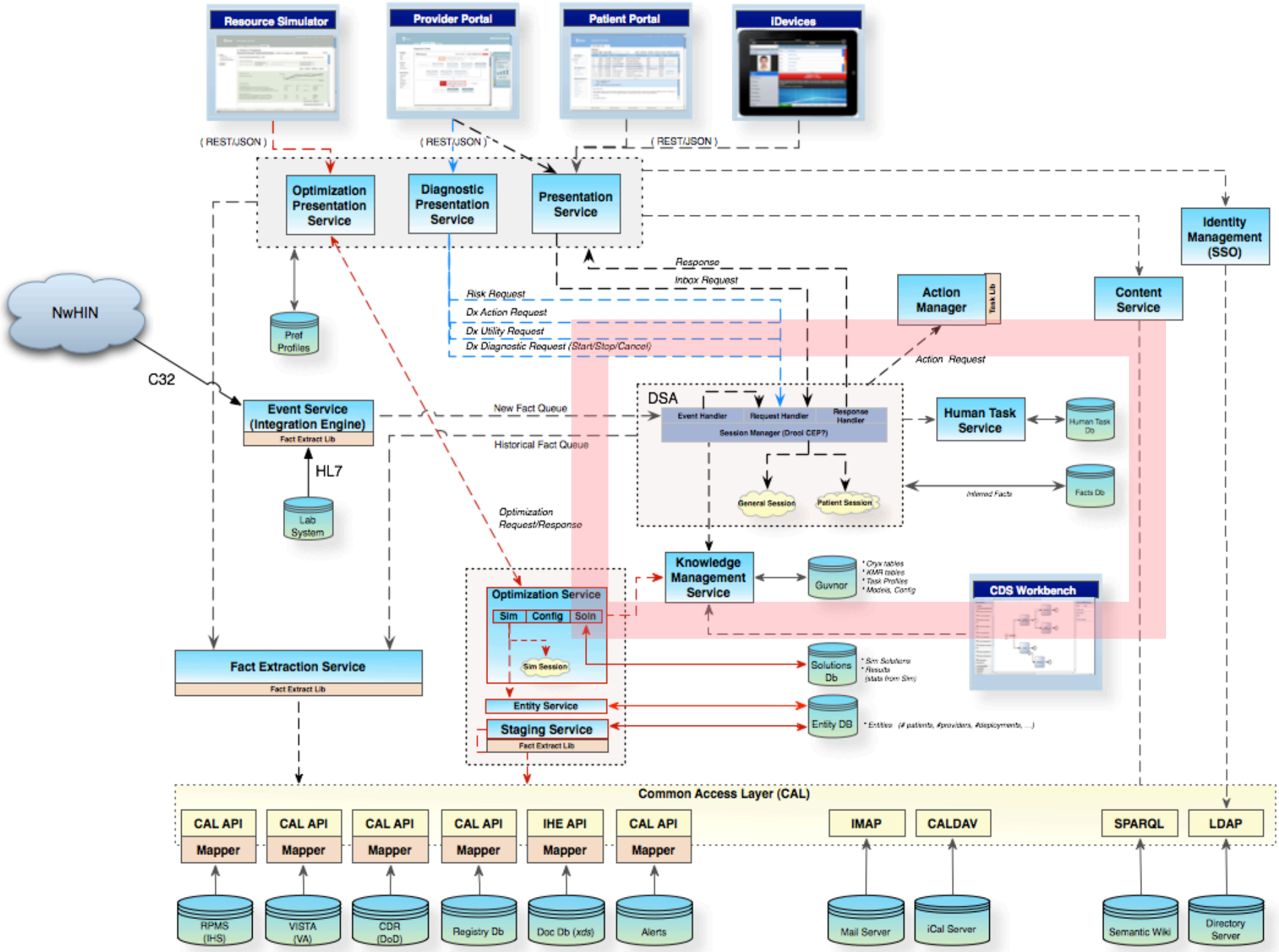
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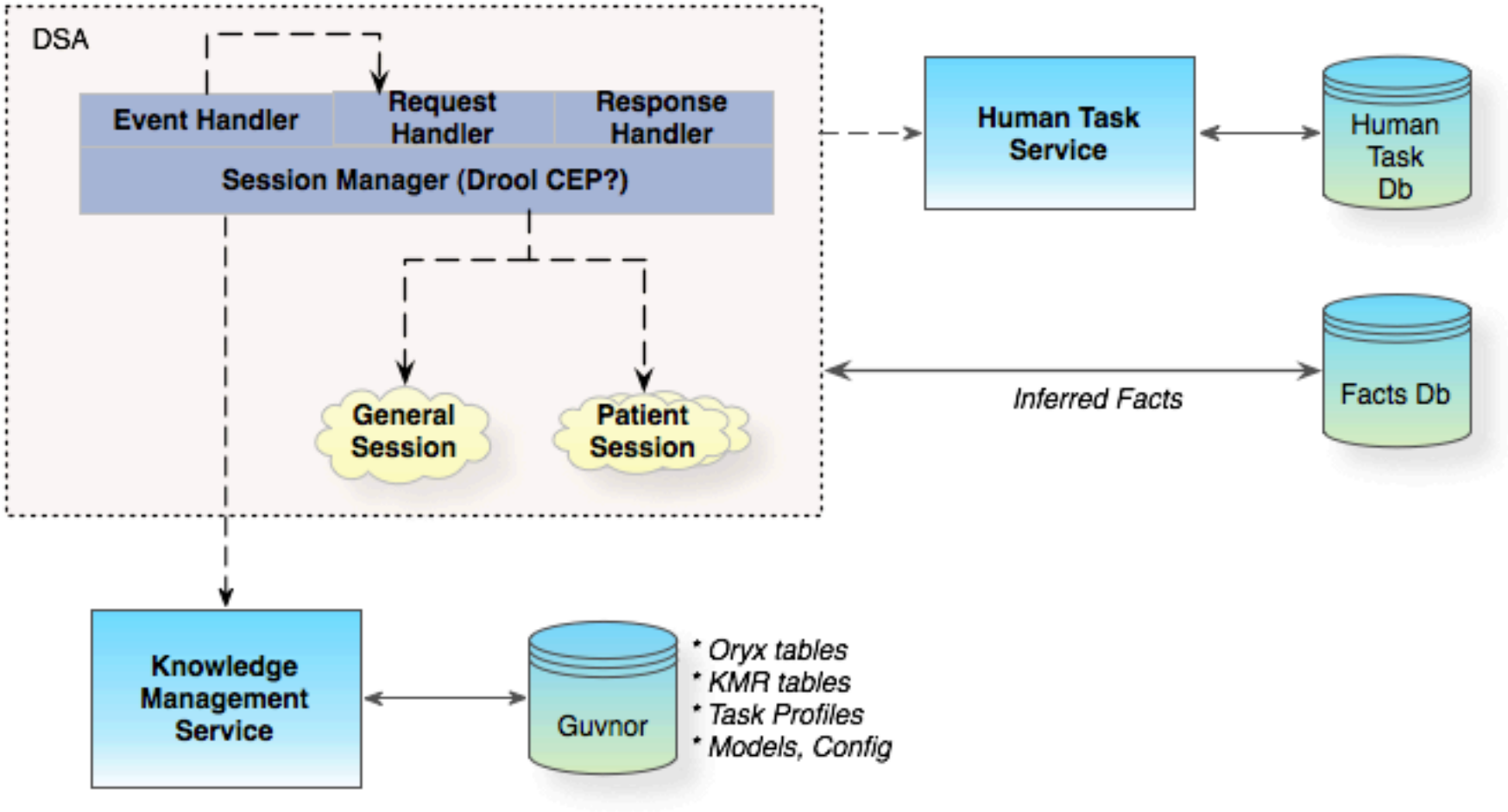
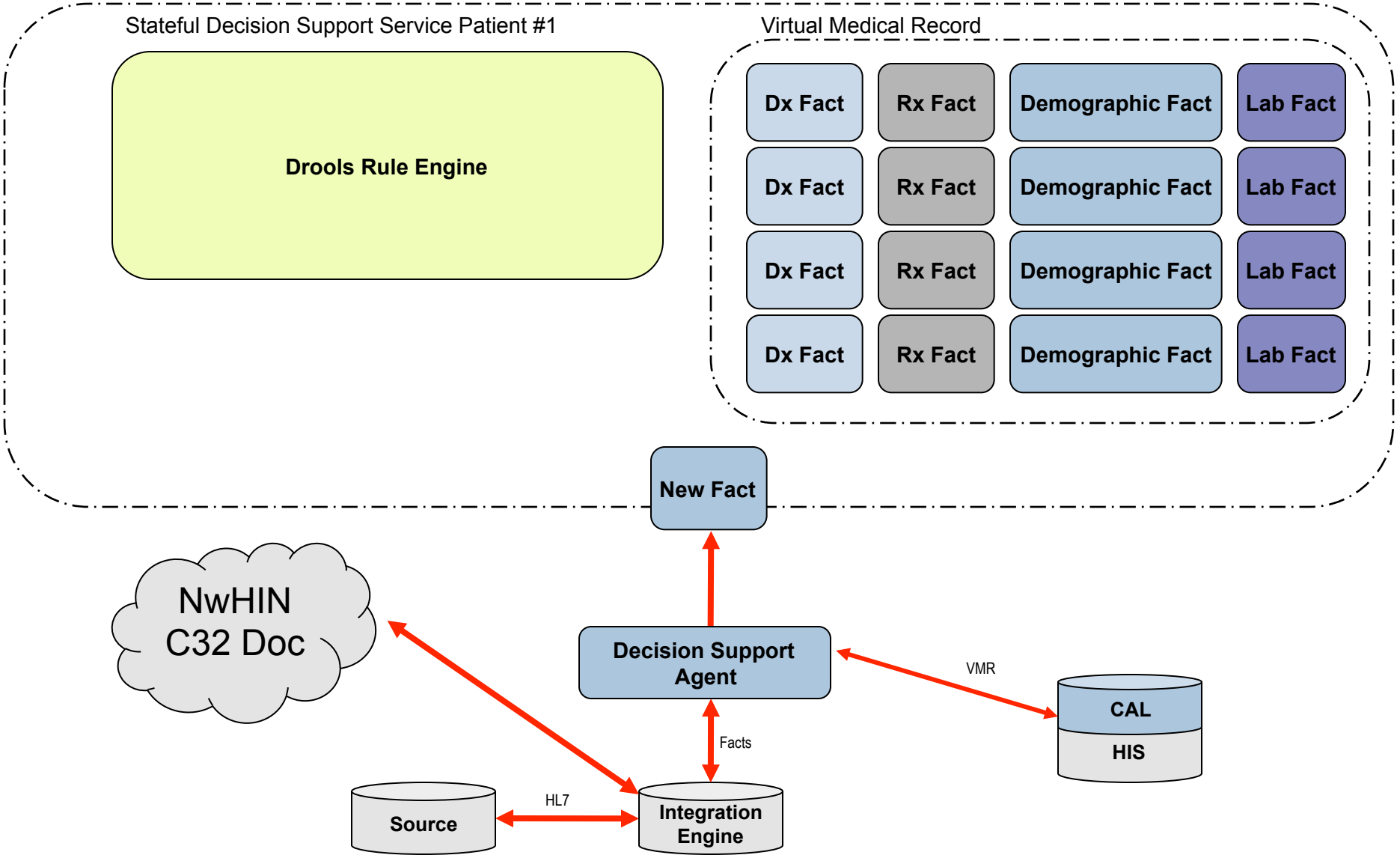
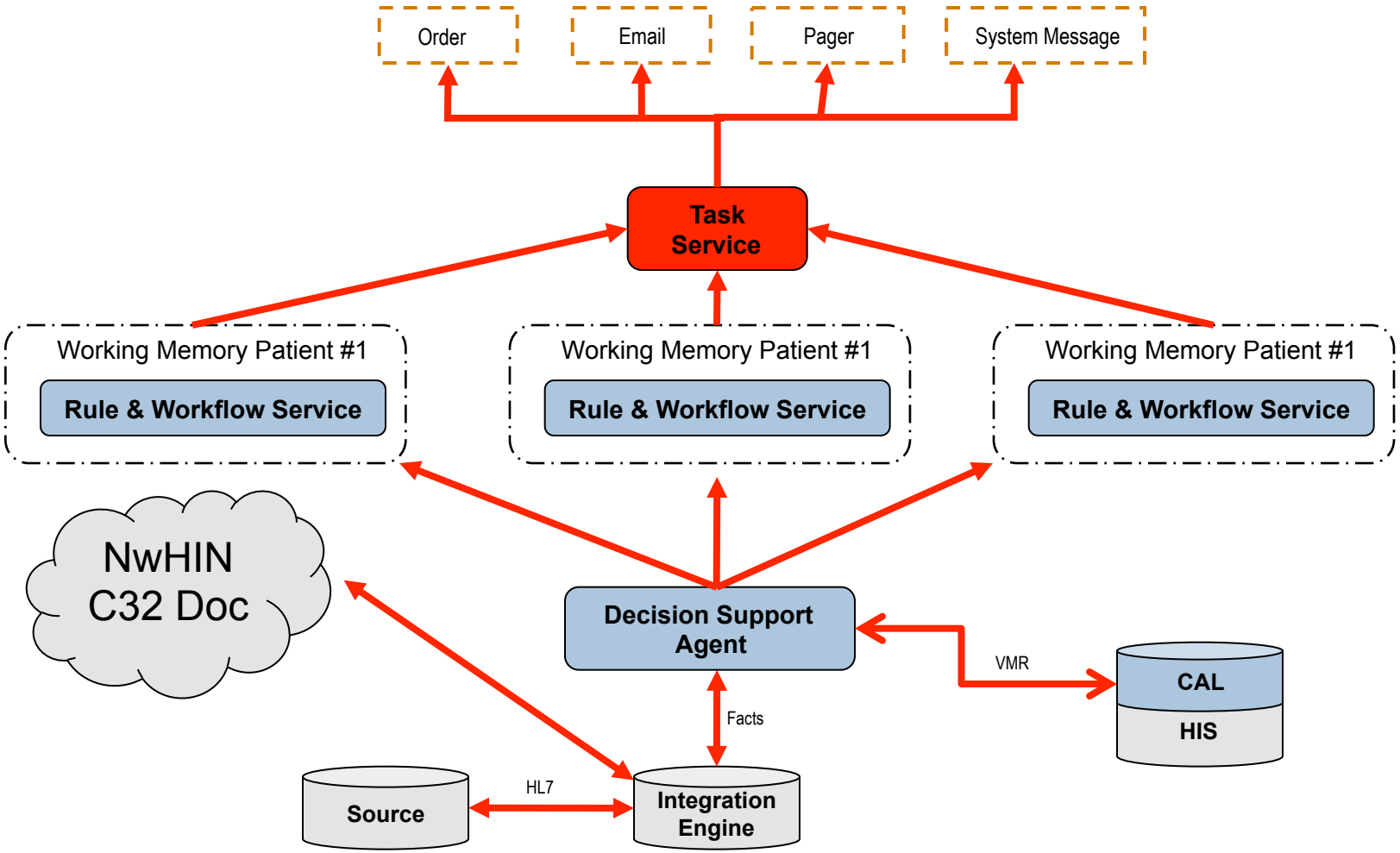
Decision Support Agent (DSA)

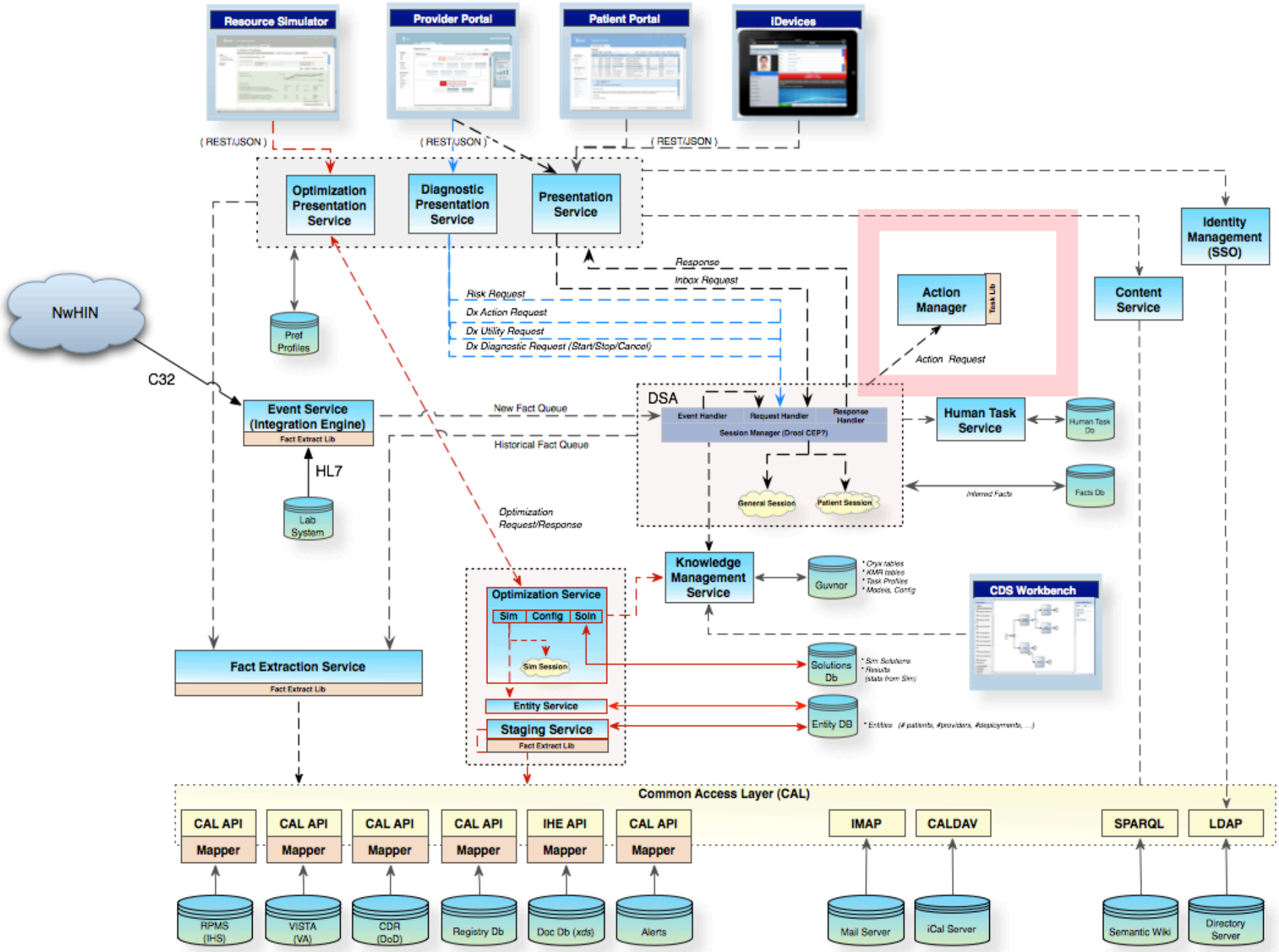


Session Virtual Medical Record



Individualized Stateful Rule Sessions

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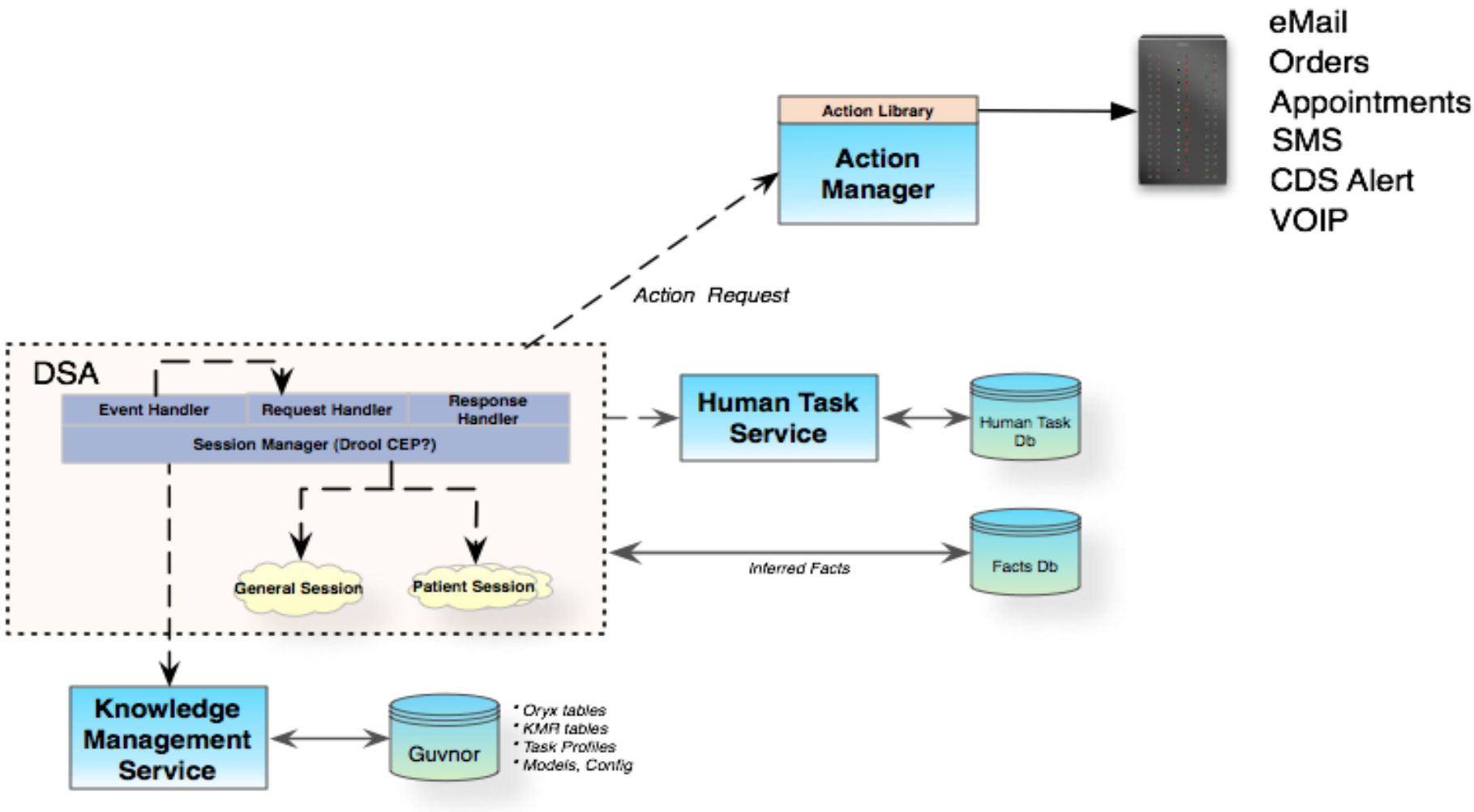

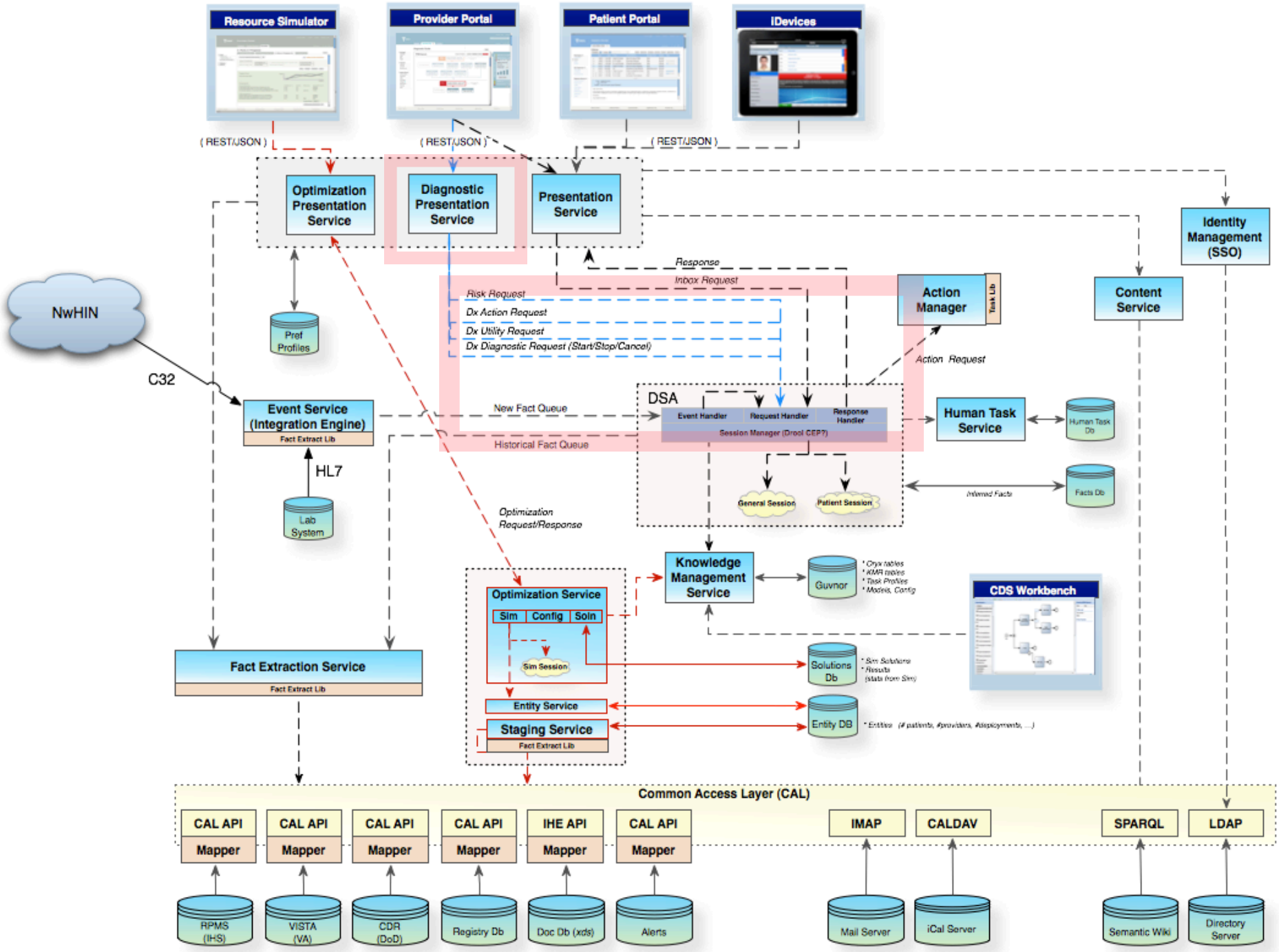
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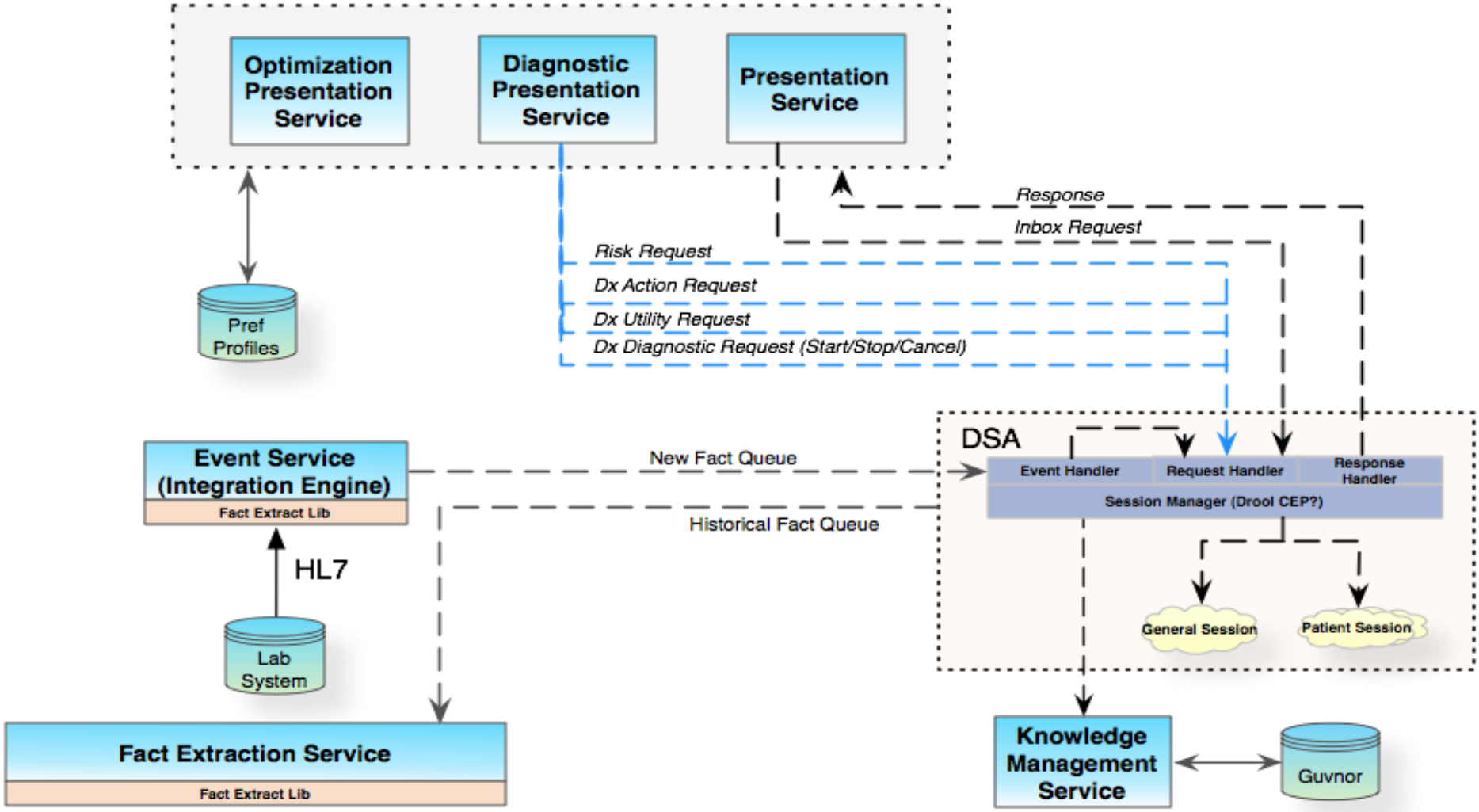
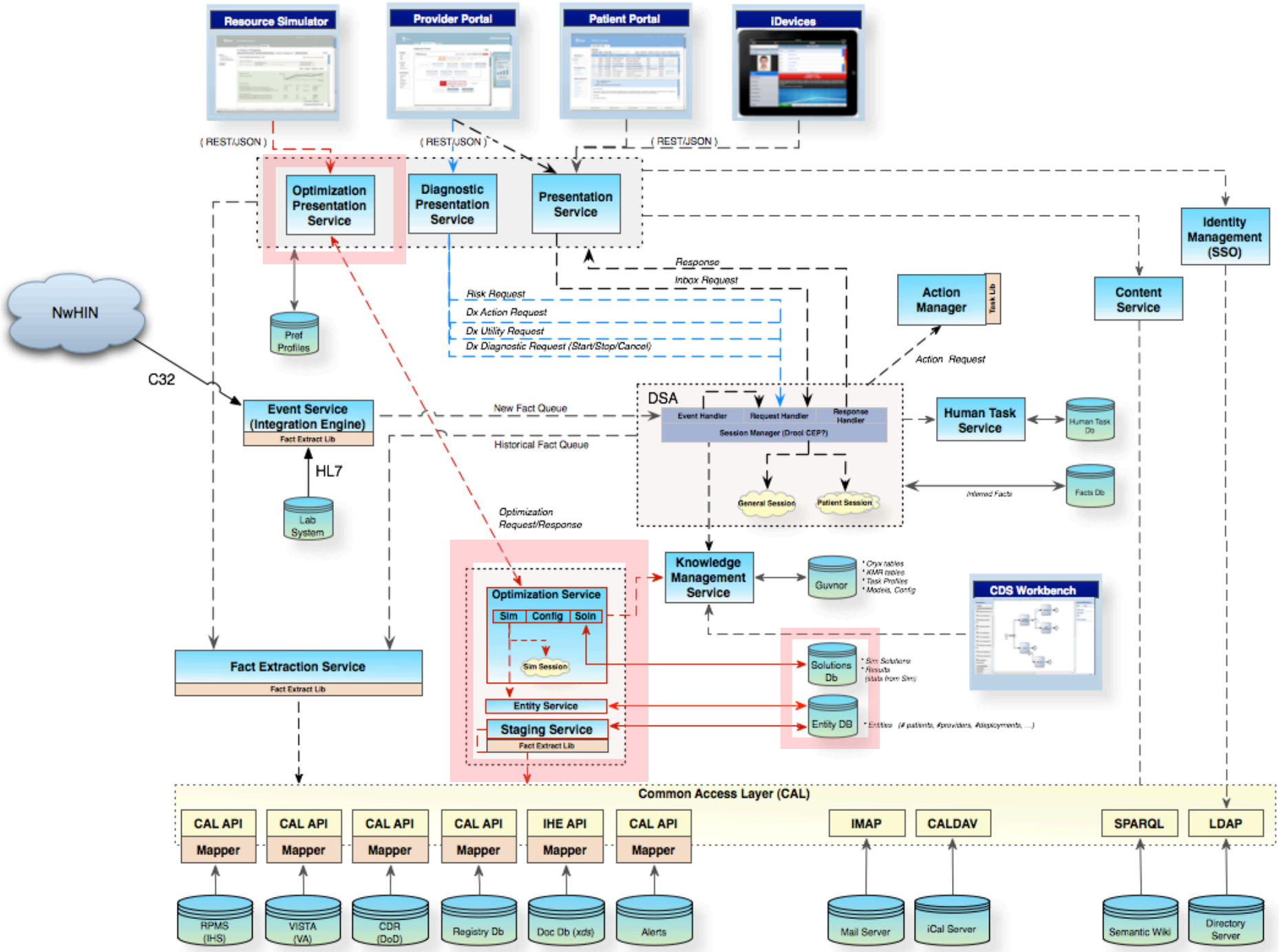
Predictive / Diagnostic Services

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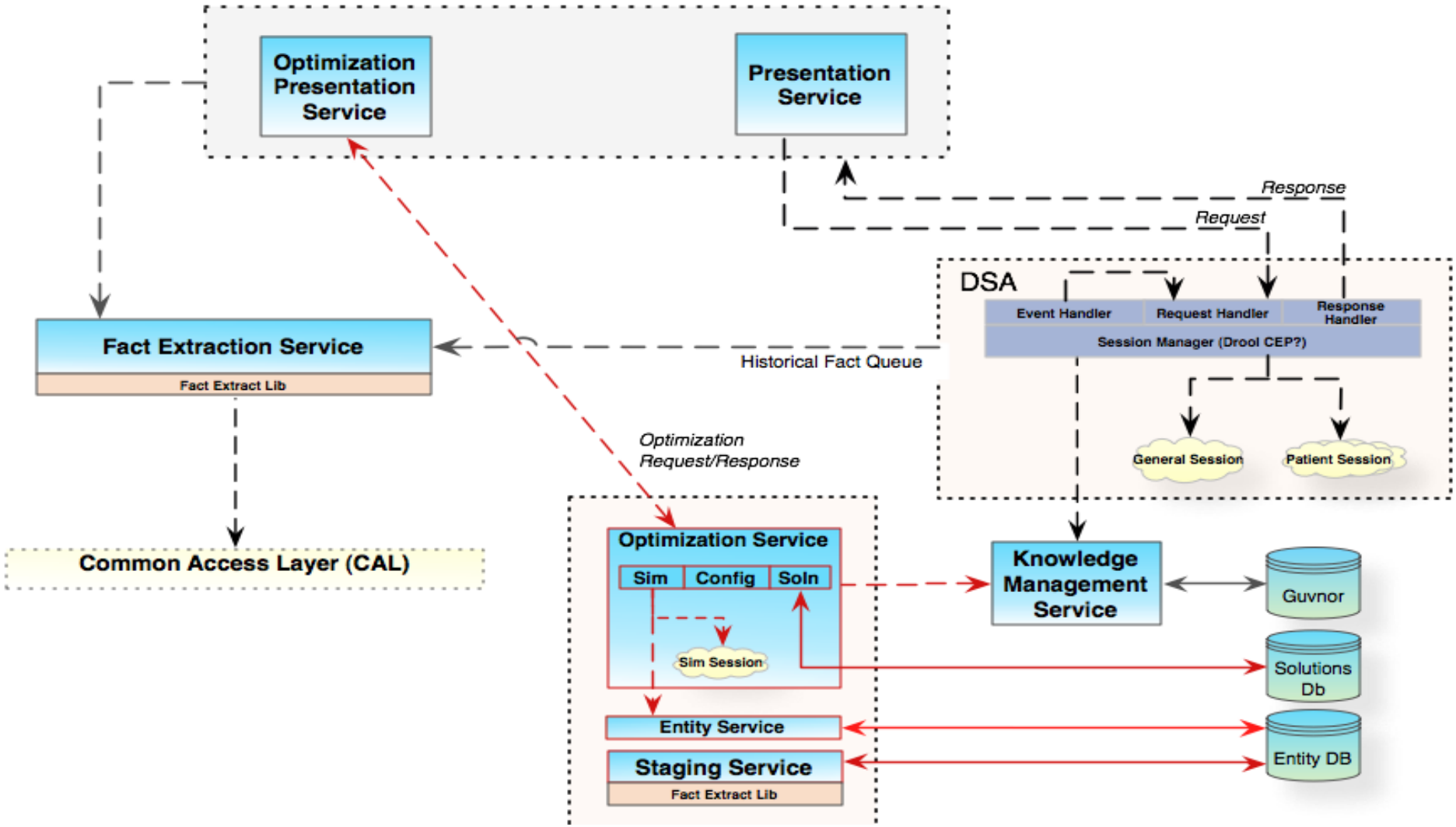

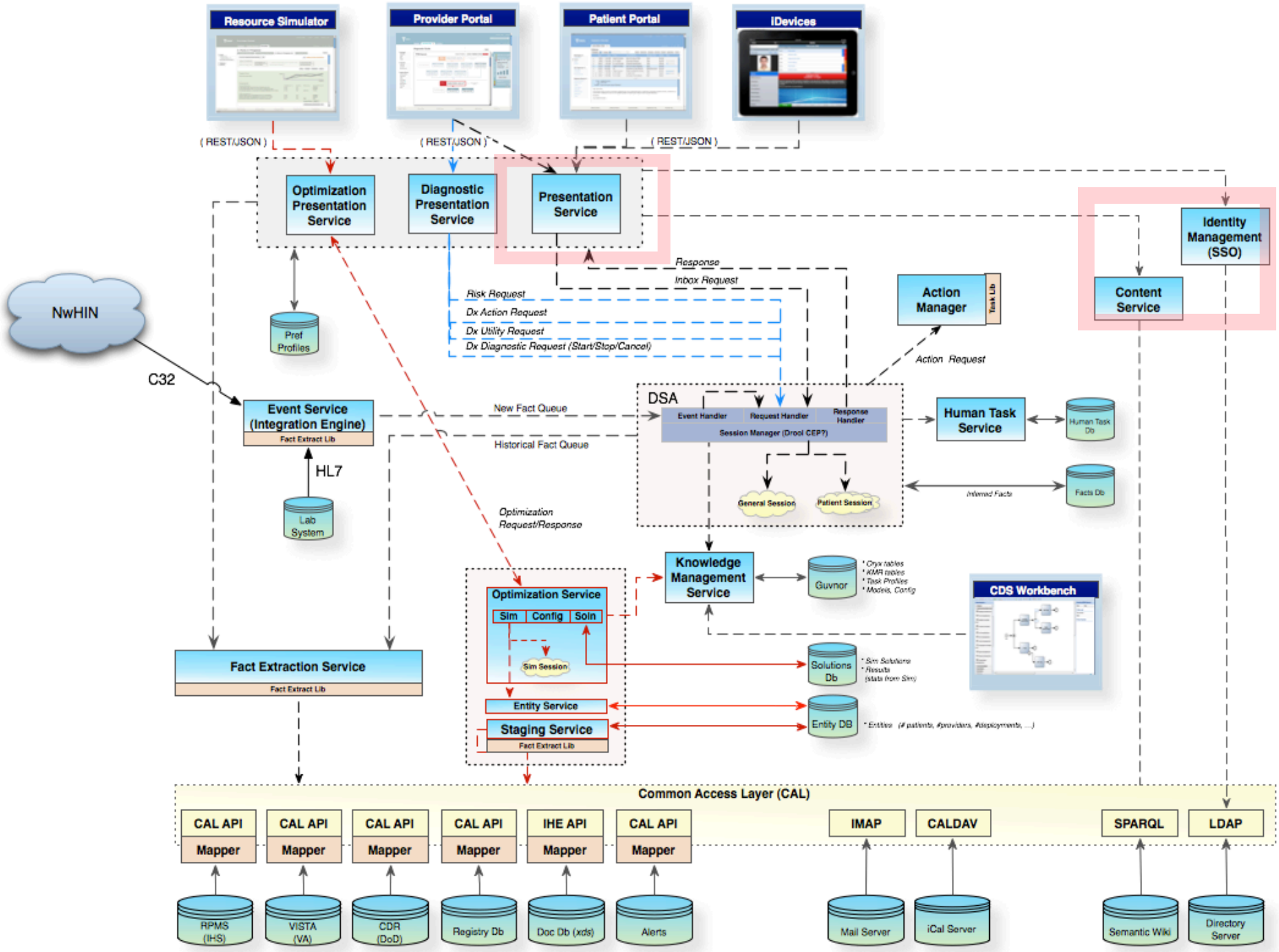
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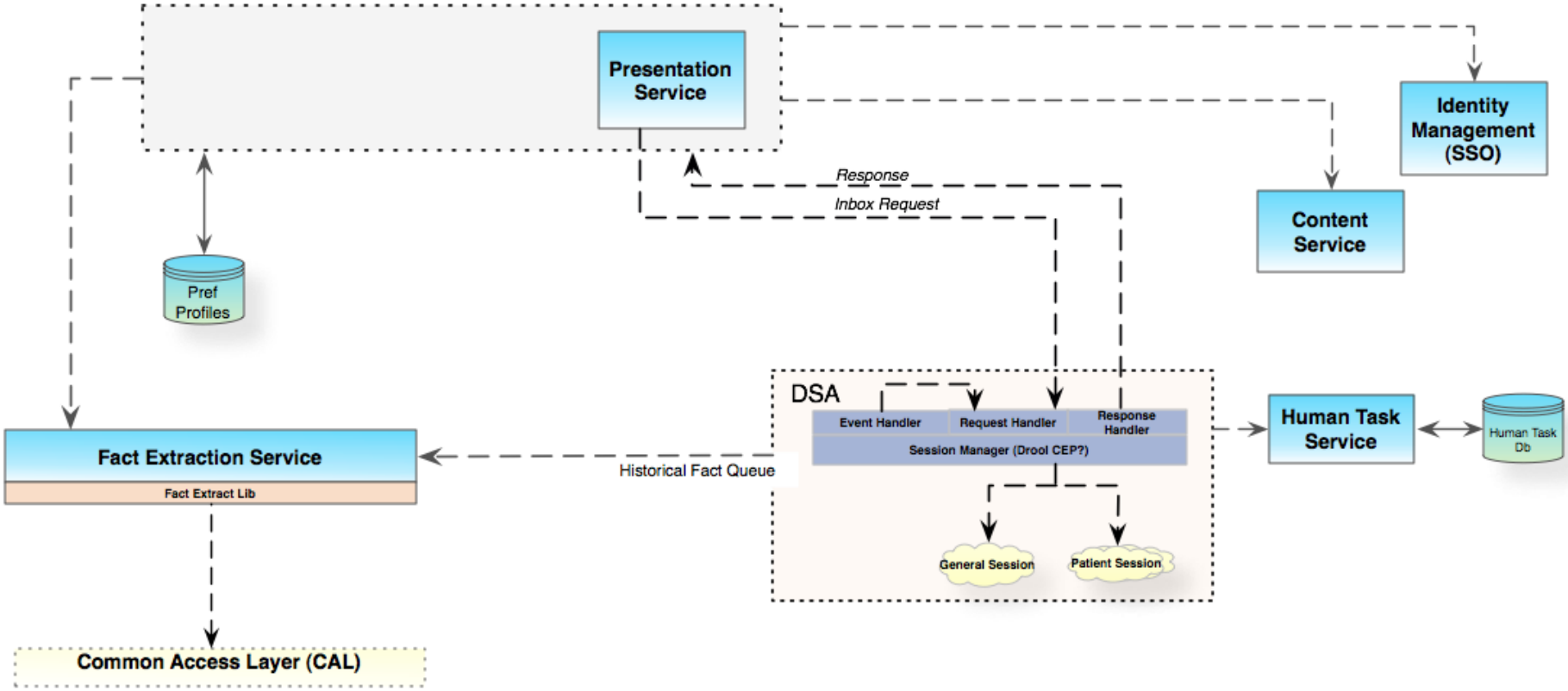
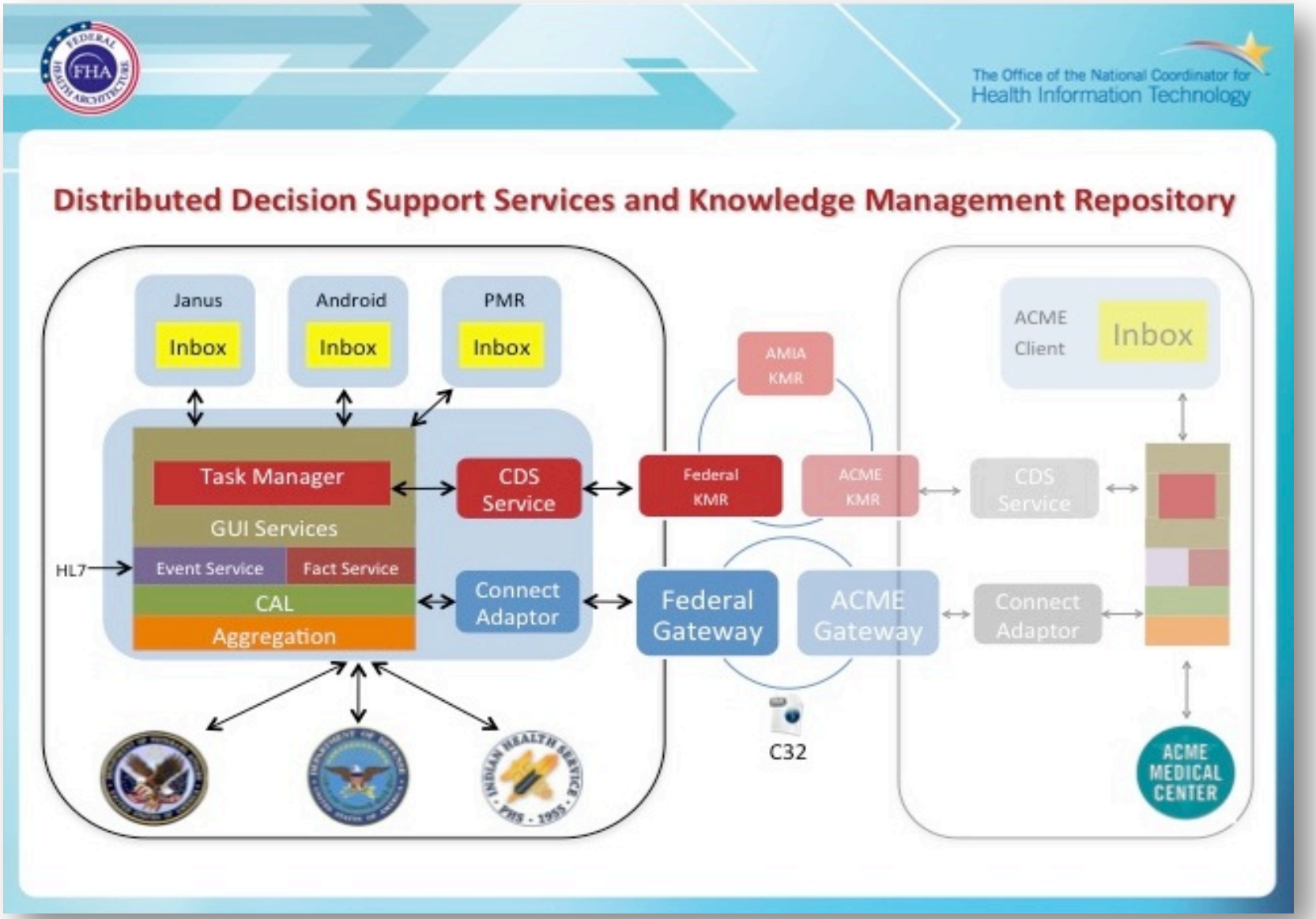
Presentation Service

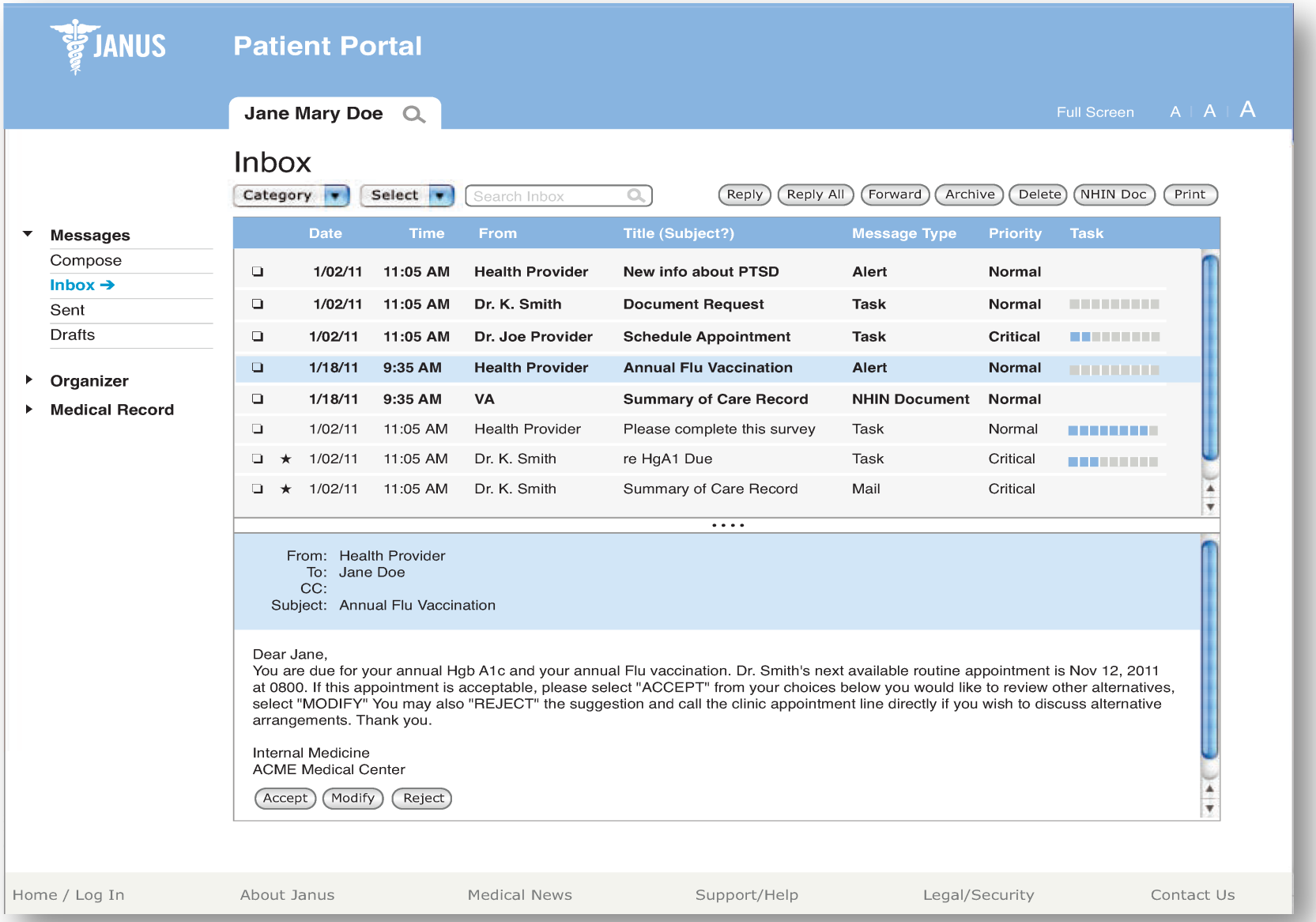


HIMSS Demonstration

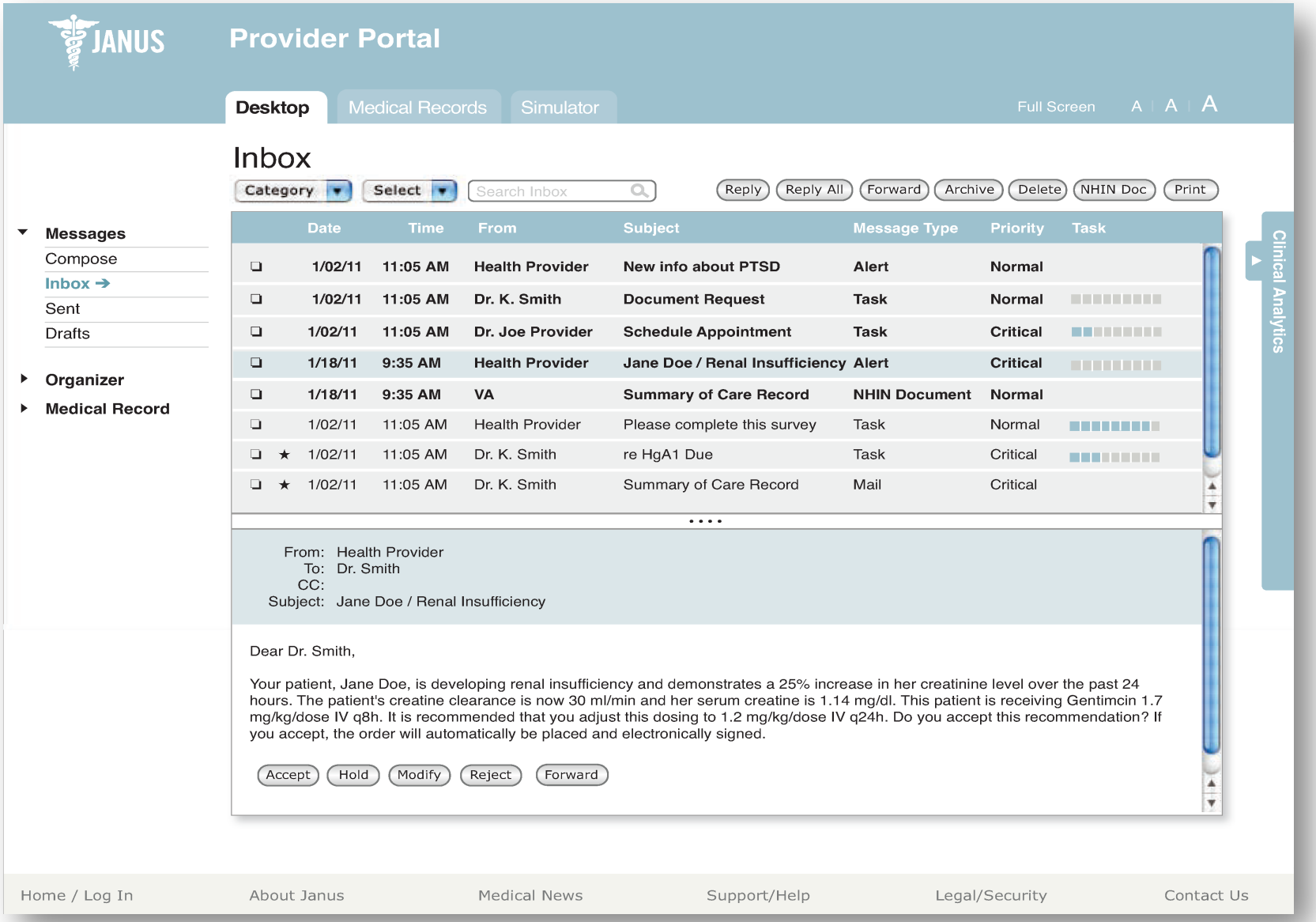


Unified Clinical Portal

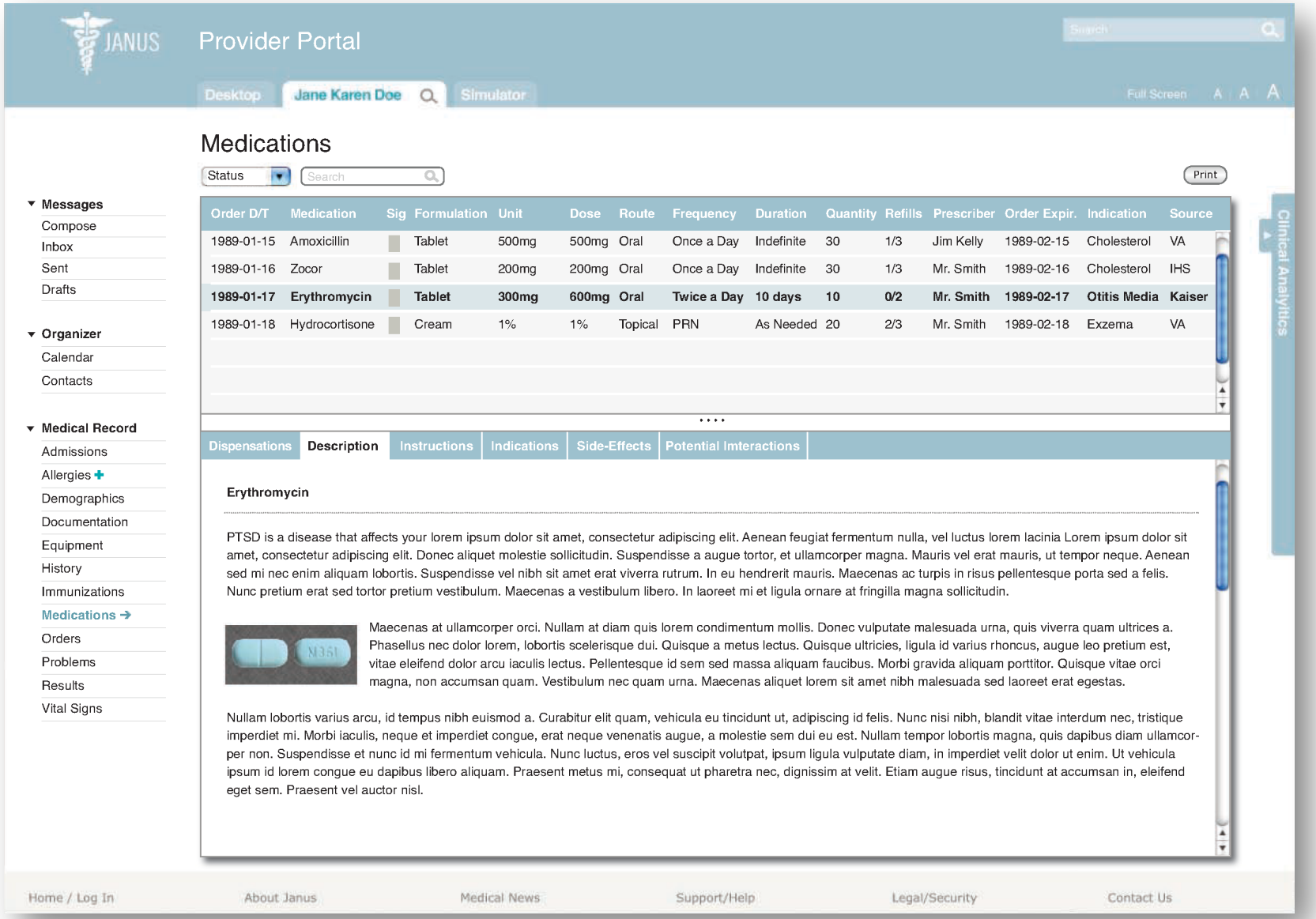
Patient Perspective



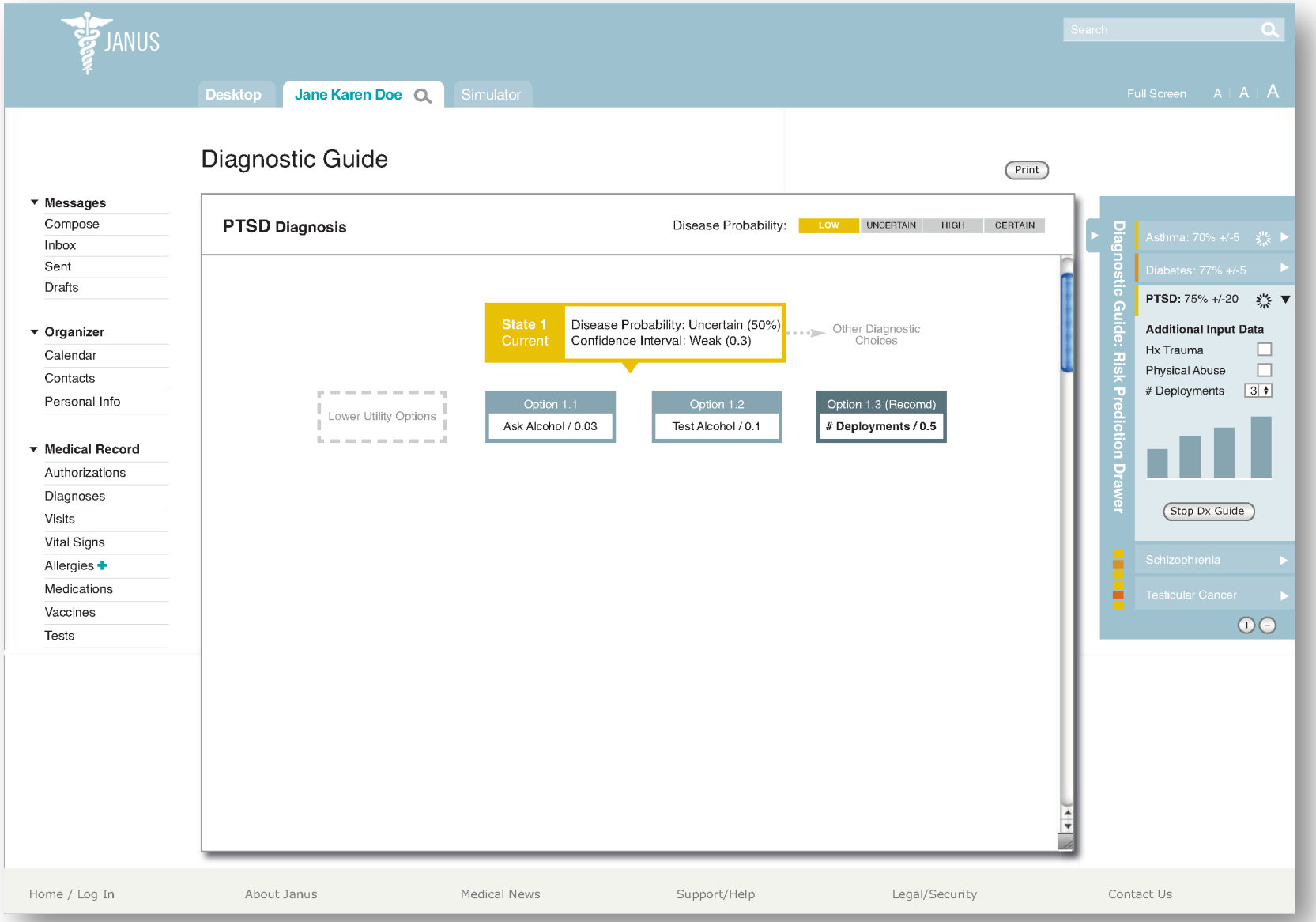
Provider Perspective



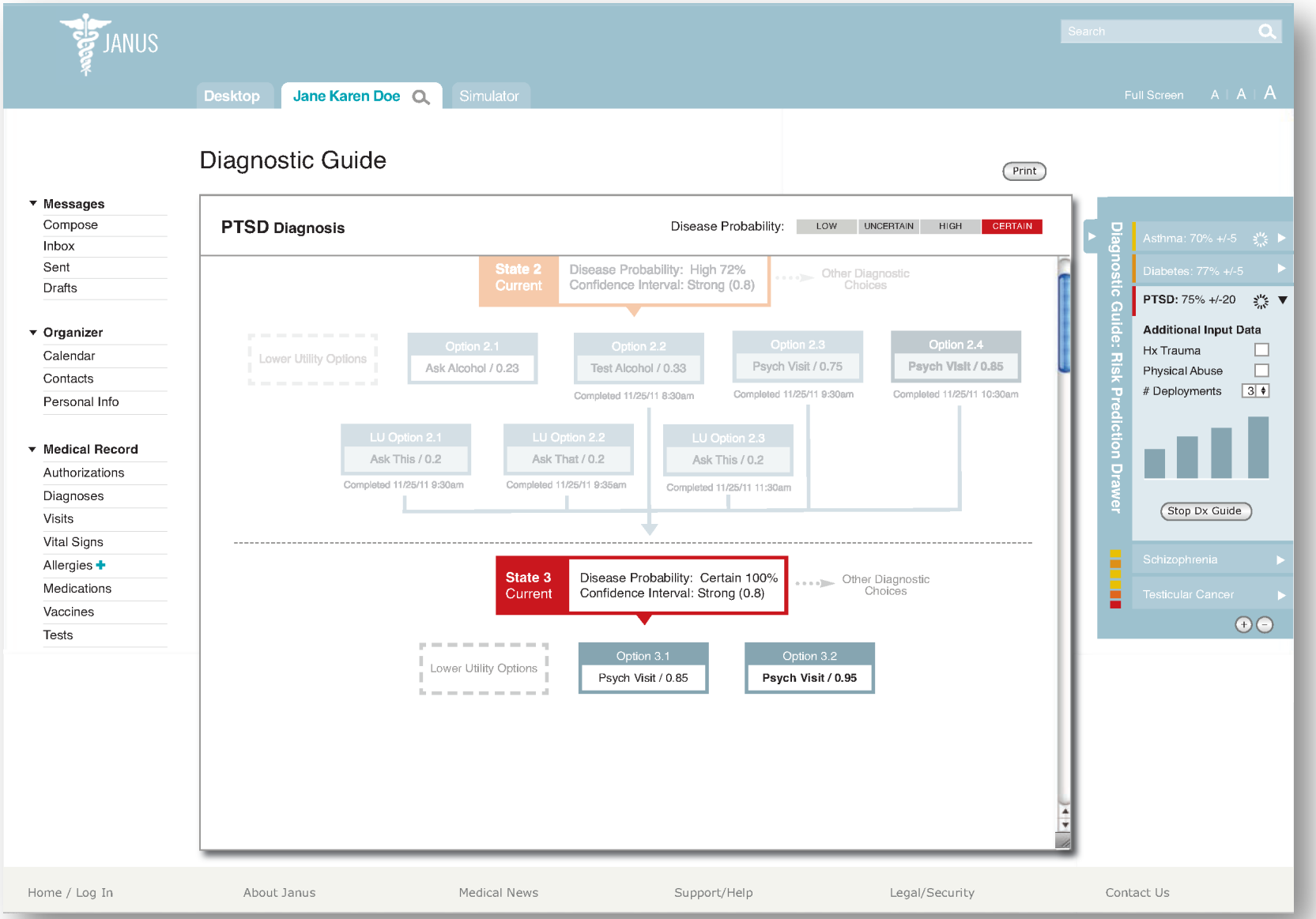
Educational Content



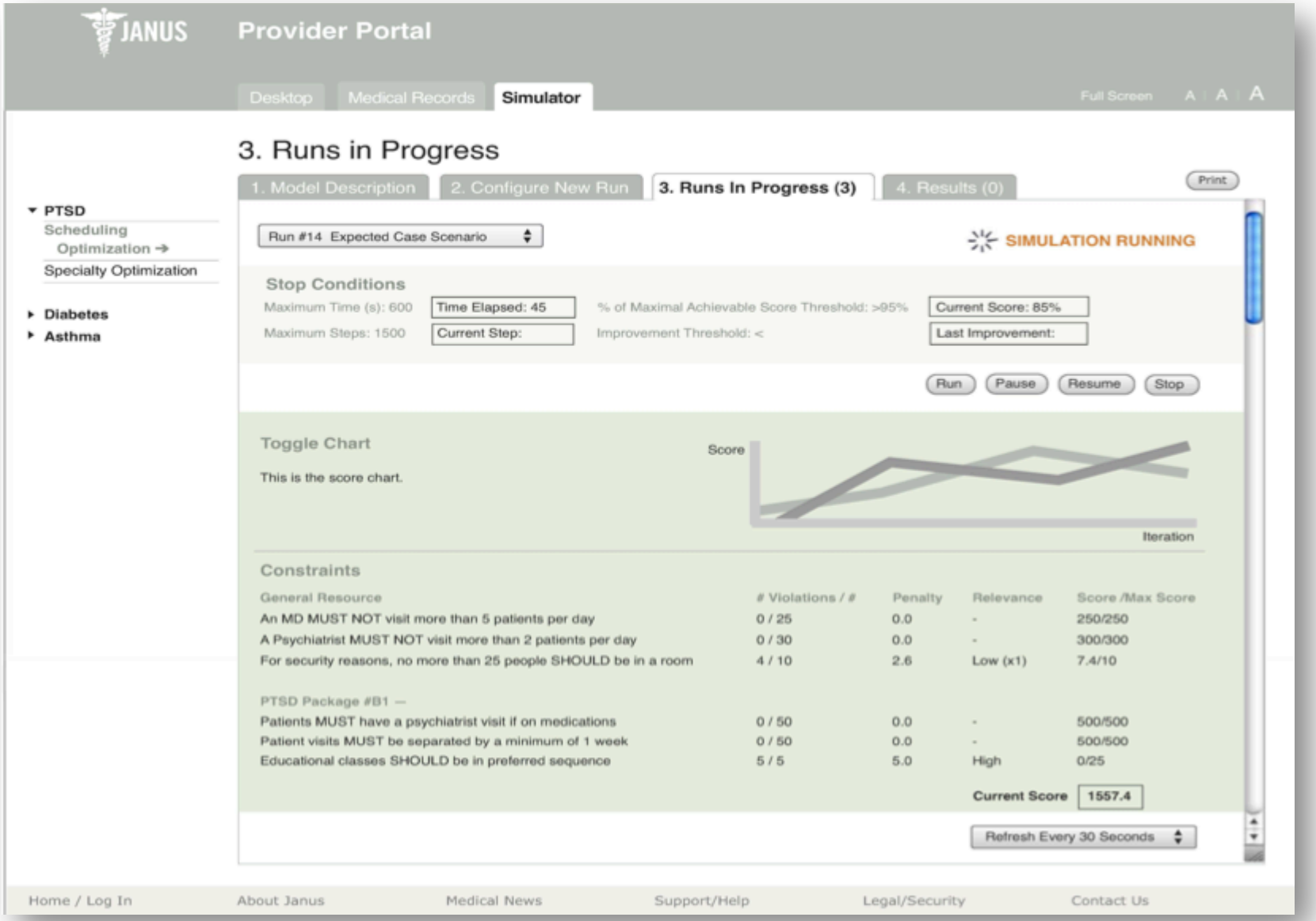
Diagnostic Guide



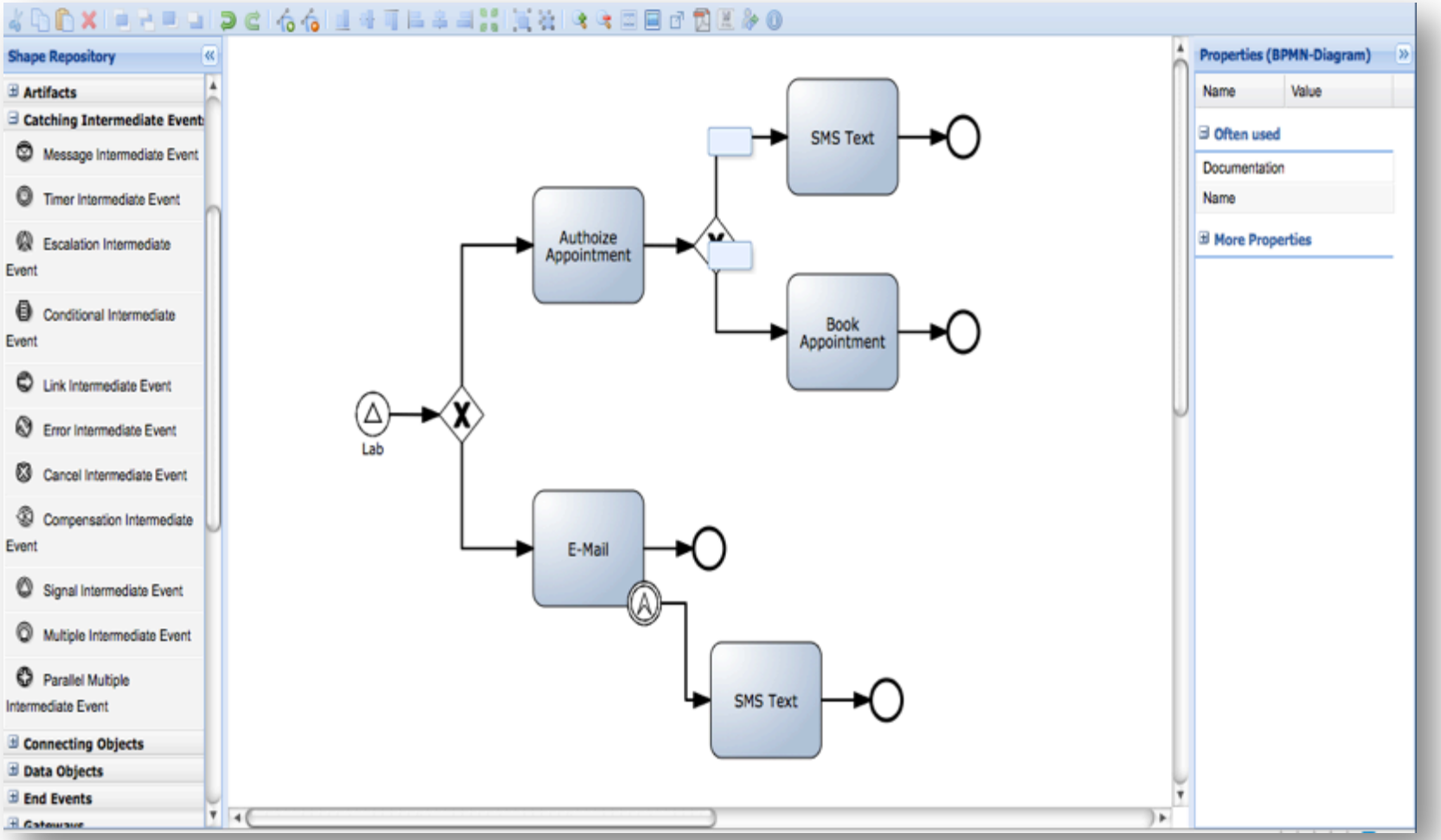
Utility Calculations



Resource Capacity Simulator



CDS Workbench



iDevices


ABC 3G 6:20 AM
Wards
3West-Ortho
Cancel
Name Bed Age Status
Pete Cash B302 46M
John Gruber A309 36M
Tina Hewitt B333 67F
Tim O'Reilly A312 78M
Mary Siegler A332 55F
Biz Stone B334 32M
Elle Williams A307 23F
Mark Brown B320 36M
Priority
Unread
Bed


Patients
Alerts
Sort
Pete Cash 40M
Pete Cash B302 40M
Alerts
Medications
Allergies
Problems
Procedures
Radiology
Encounters
Admissions
Notes
6/22/2010 16:30
Creatinine: 1.3 mg/dl
Do you accept this recommendation?
Accept

Key Functionality

- Standards compliant canonical object model
  - Defines clinical fact structure and semantics
  - Constrains rule authoring and run-time bindings
- Knowledge Repository semantically cross-indexed
  - Artifacts searchable by specialty, fact types, tasks, disease, role, etc. across organizational boundaries
- Integrates multiple inference technologies
- Manages individualized, stateful inference sessions with asynchronous workflows and task execution
- Provides for user interaction / data visualization research
- Tooling to facilitate domain knowledge creation and translation

Conclusion

- DDSS-KMR is a reference implementation for CDS and human process reengineering research
- Open source and will be donated to FHA for inclusion in CONNECT and / or DIRECT as appropriate
- Goal is to create a “stack” available to government, academia, and vendors for exploring concepts, sharing results, and improving the reference implementation over time
- Infrastructure is decoupled, standards based, and semantically constrained - real-time hybrid architecture for healthcare