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Integrated Information System for Multi-criteria Management of Orthopedic Infections

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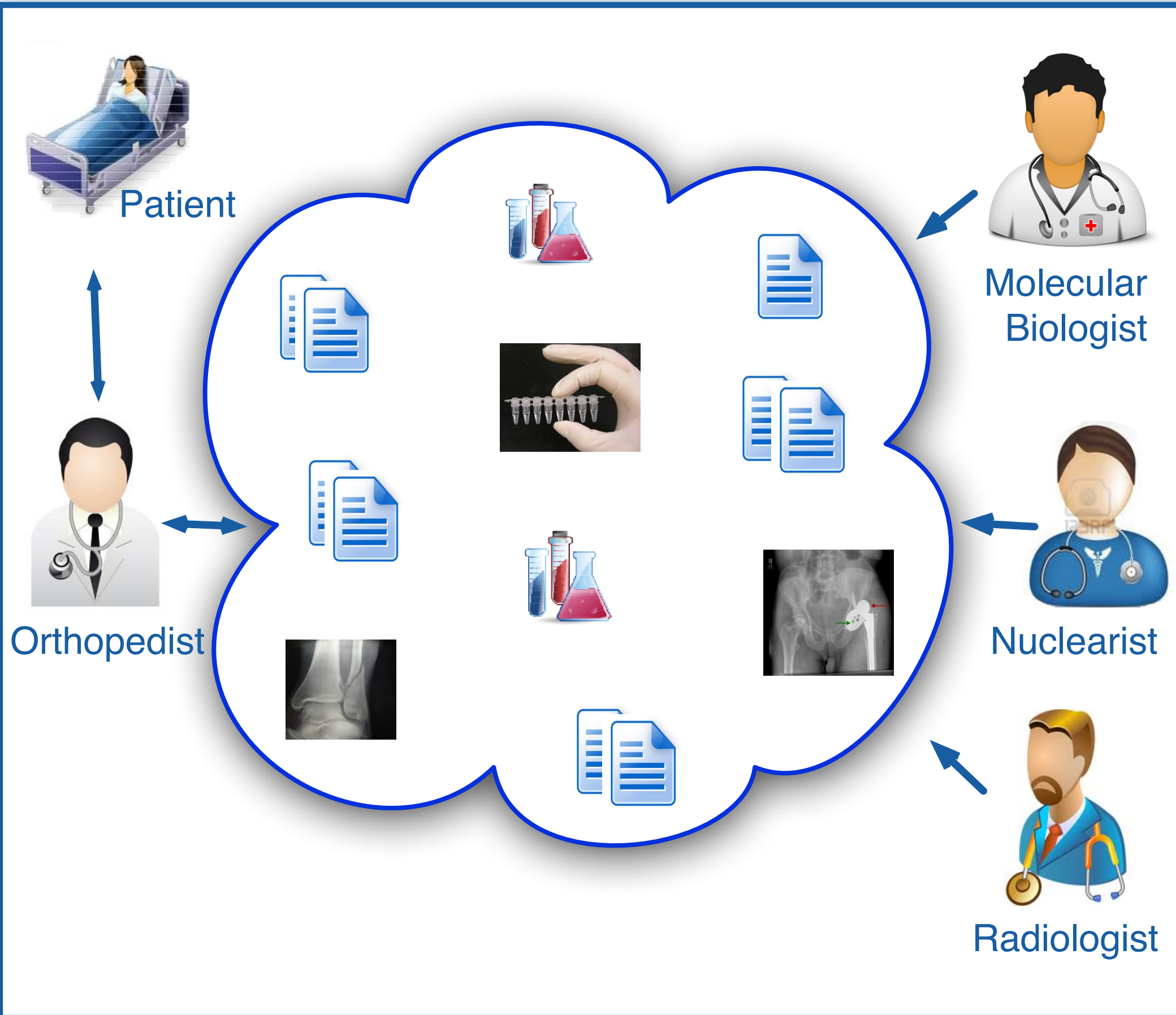
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Motivating Context

Orthopedic Infections Diagnosis

- Complex**
 - Many infections lasting several months
 - Unadapted Antibiotherapy : Multi-resistant Bacteria
 - Septic vs Aseptic (chronic infections)
 - ⇒ Pluridisciplinary approach
 - Imaging
 - Patient History
 - Aspirates/Biopsies
- Long and Tedious**
 - Bacteria Identification (conventional culture methods)
 - Slow growth : from two day to two weeks
 - Living bacteria create risks of contamination
 - Many False negatives
 - Slow Evolution (several months)
- Expensive**
 - Repeated Hospitalizations
 - Repeated Imaging

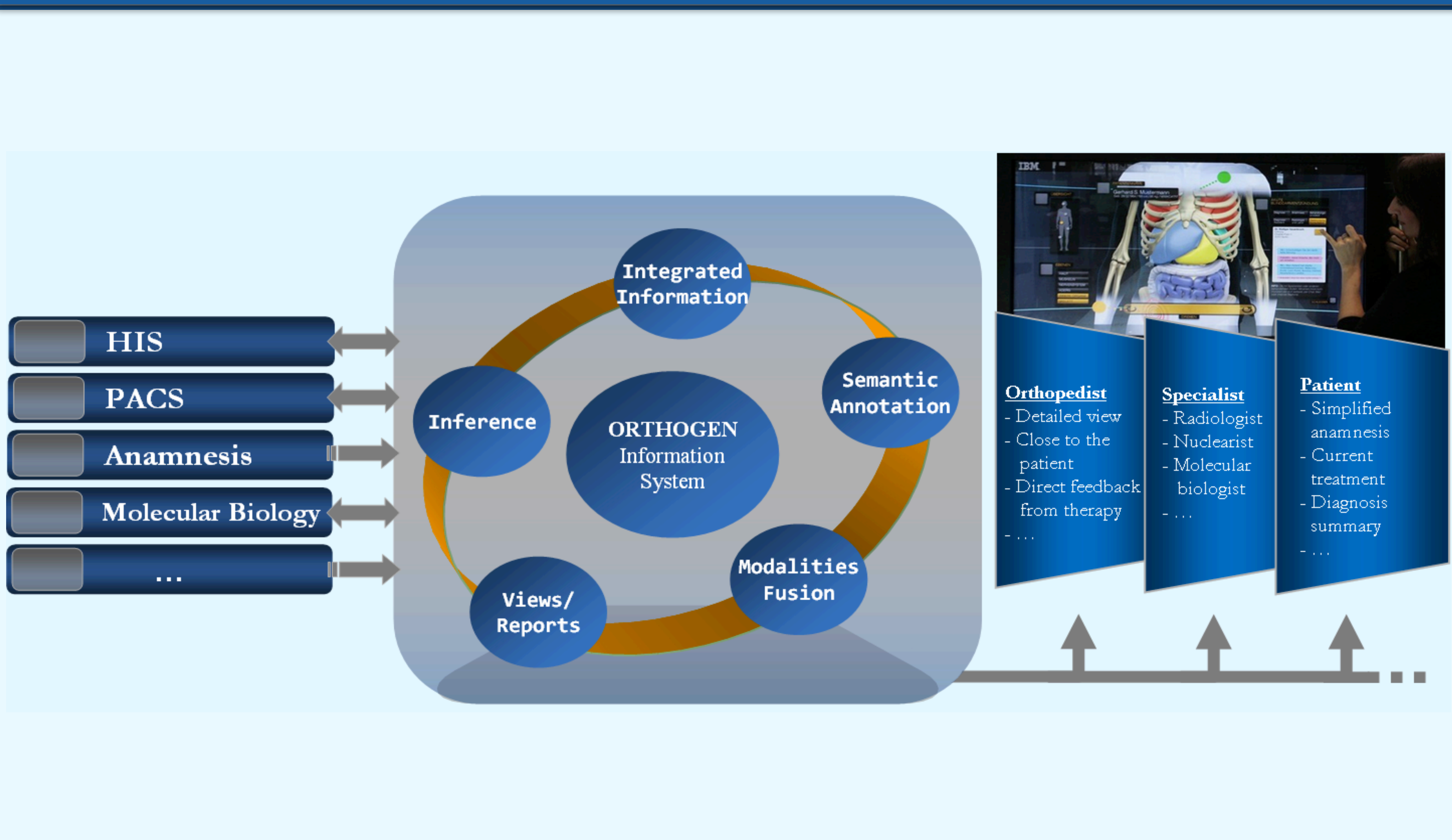


Problem Analysis

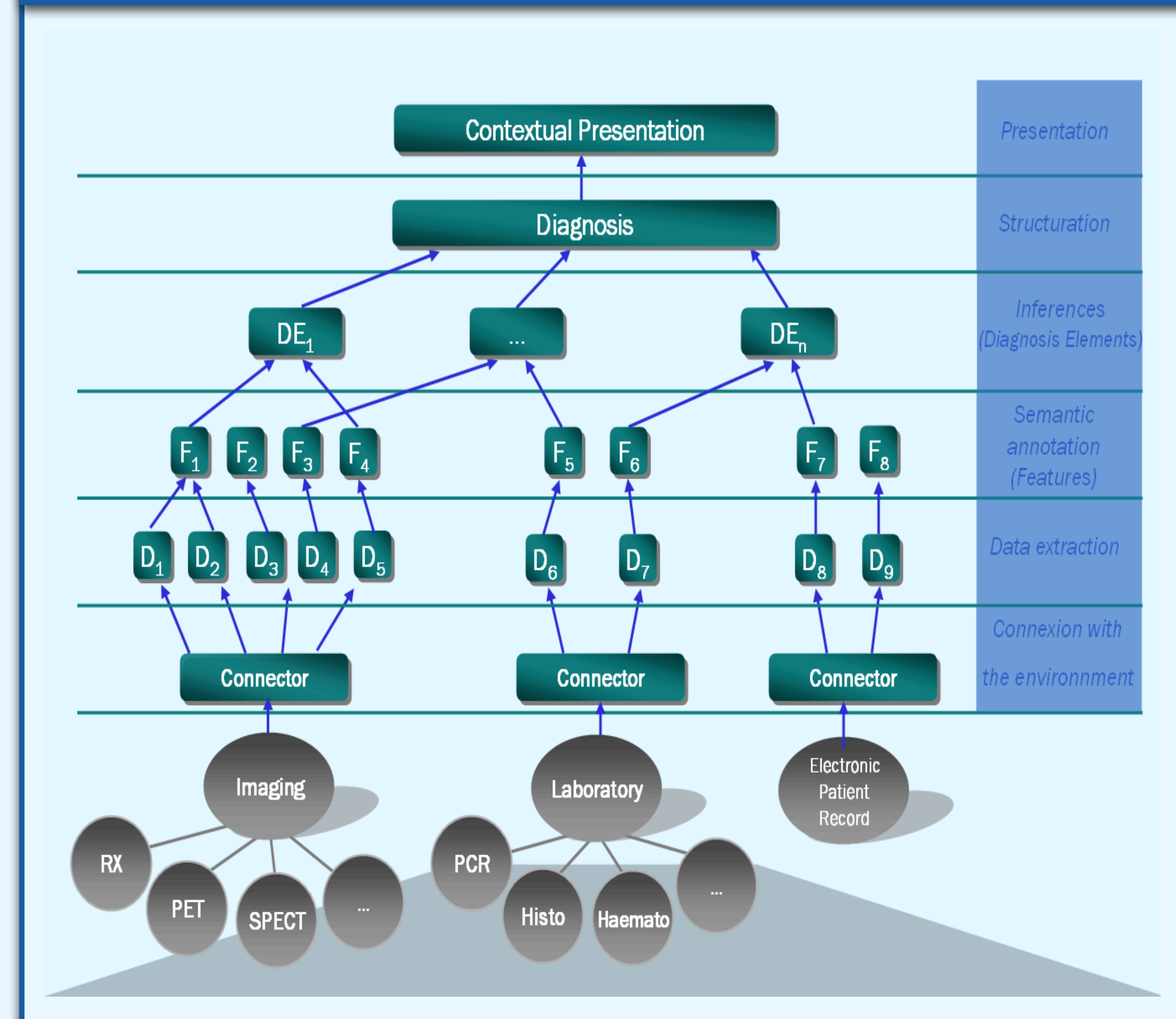
- Decision Problem (DP)**
 - Making a diagnosis
 - DP (Pattern classification)
 - Features pattern ⇒ Pathology
 - Mathematical formalization
 - Pathologies ⇔ Classes/models
 - Features (functional/descriptive properties)
 - Structuring the Decision Process
 - DP identification (Discriminative features)
 - DP structuration (Business rules)
 - Solution selection (Reasoning)
- Complex Diagnostic Environment**
 - Heterogenous data
 - Cooperation (different areas of expertise)
 - Iterative process (prospecting, guidelines)
 - Interaction with hospital entities (standards)
- Constraints**
 - Uncertainty
 - Adaptability

Challenge

Integration System

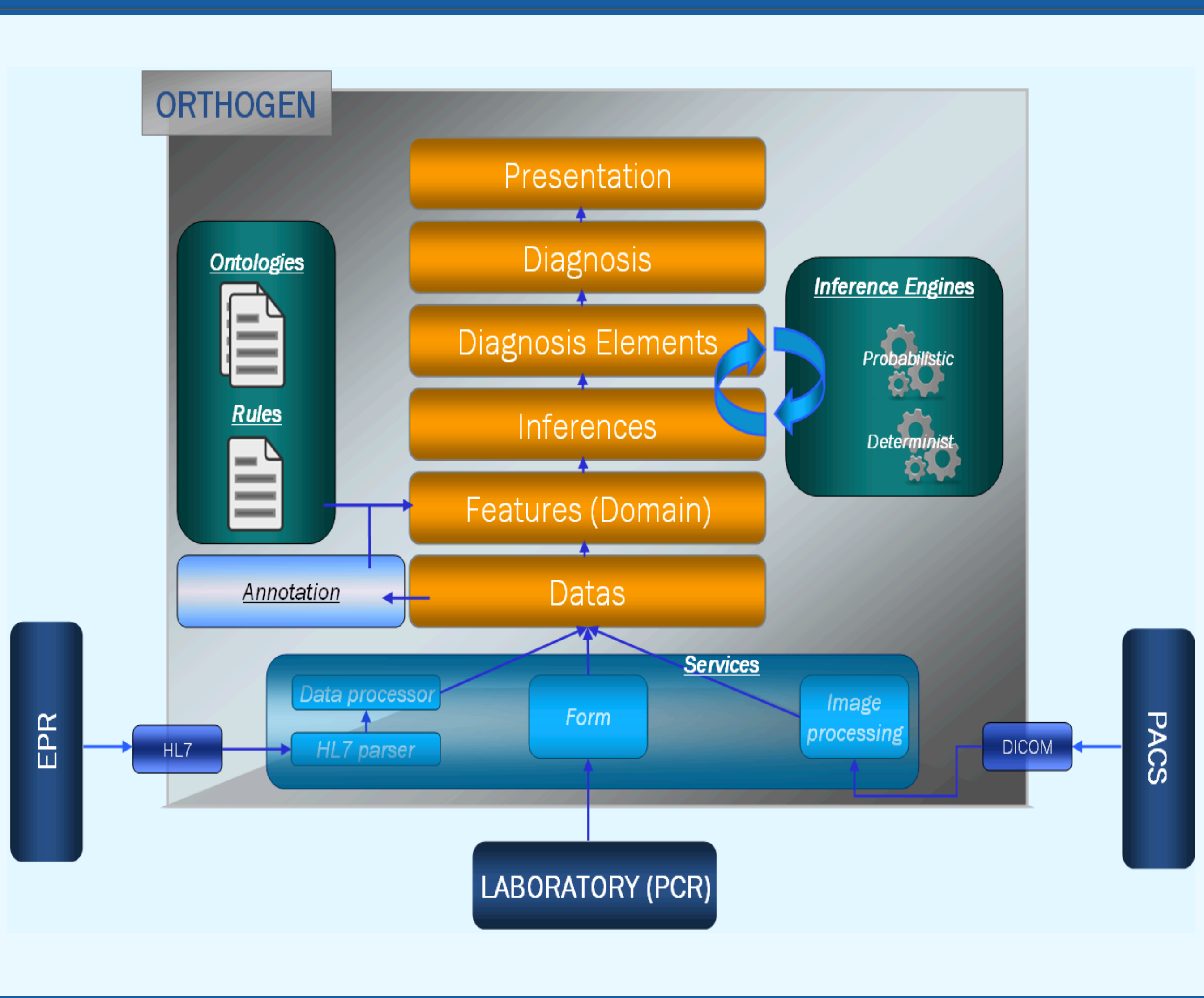


Abstraction Layers

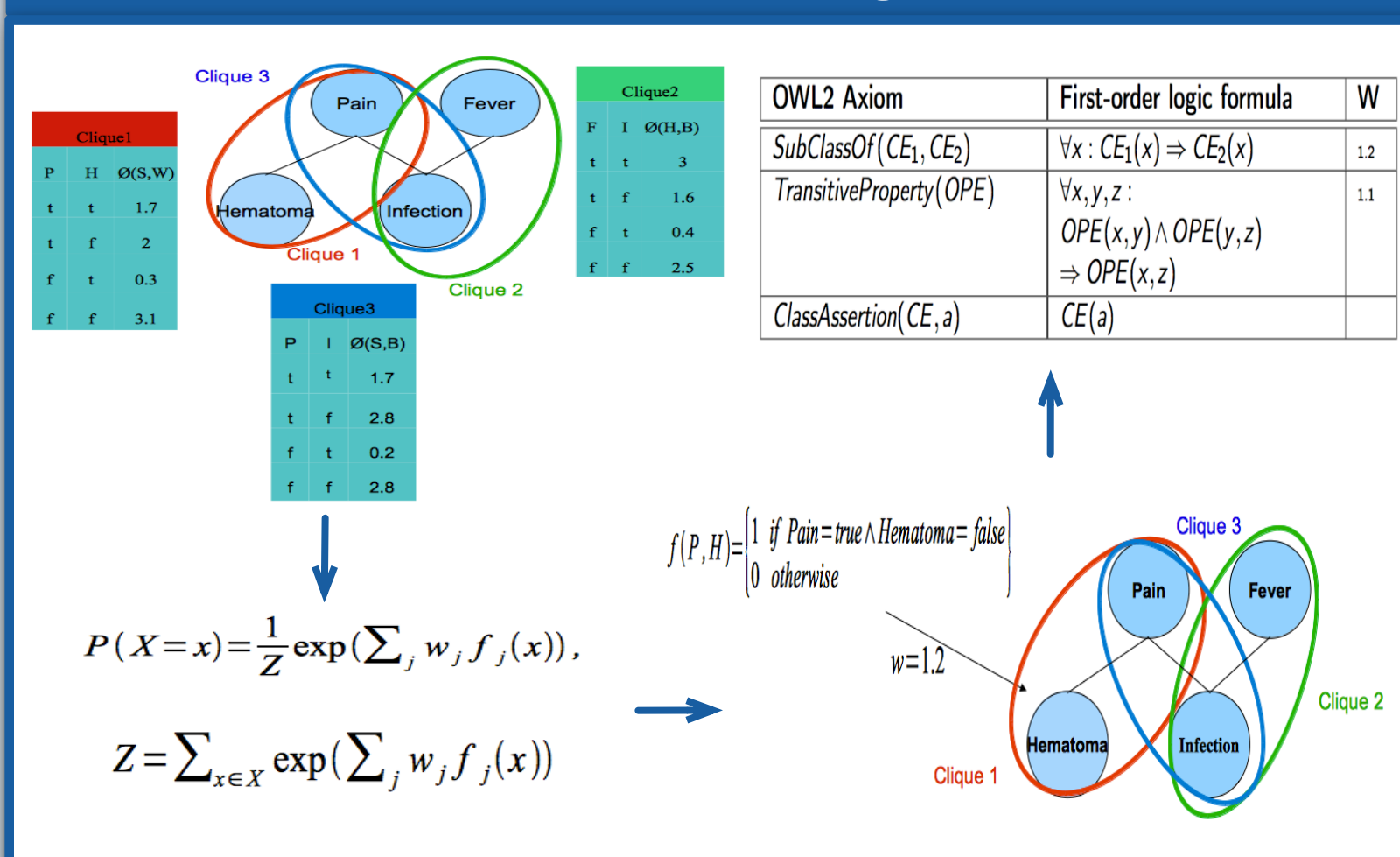


Orthogen Model

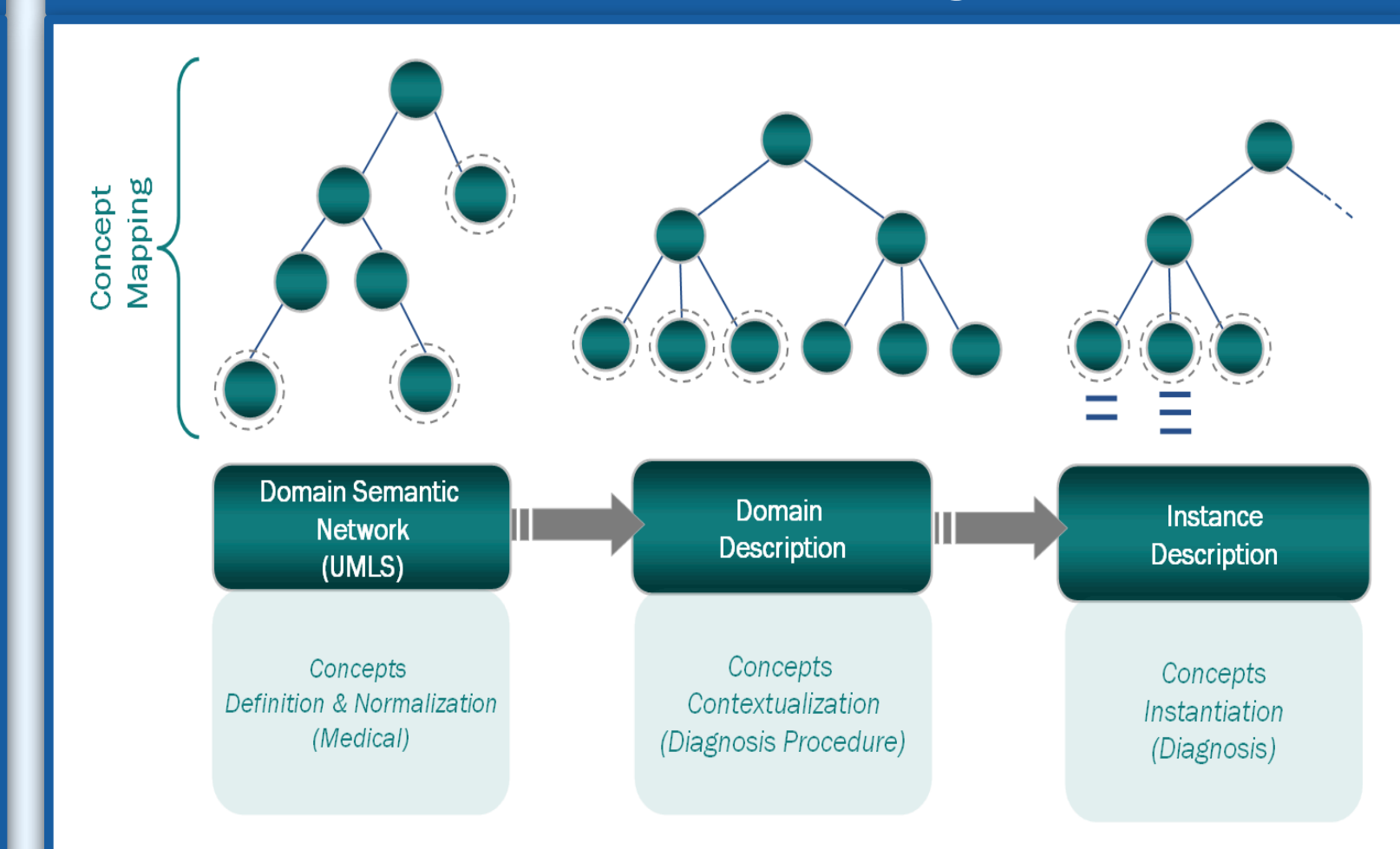
Logical View



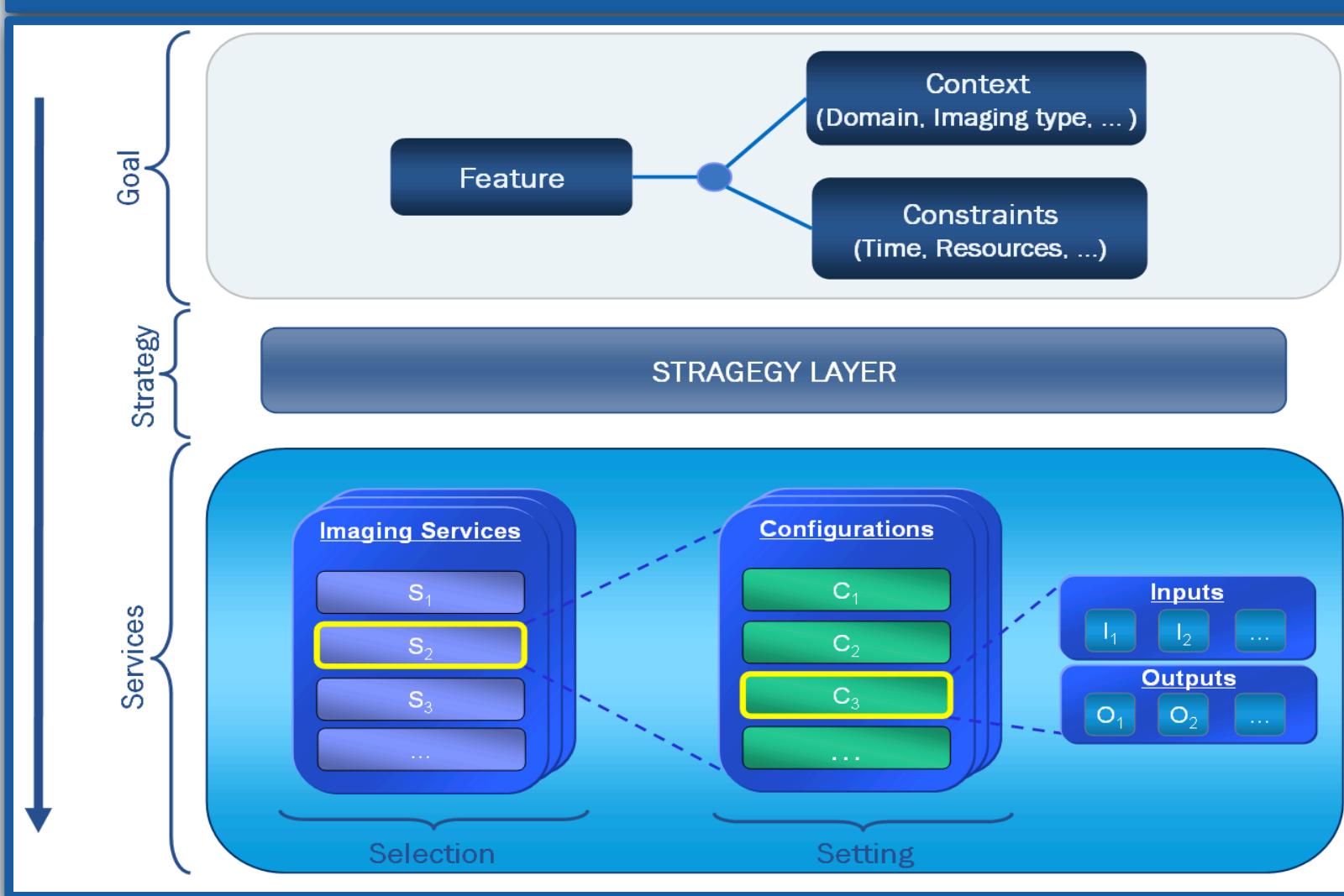
Markov Logic



Modular Ontologies



Imaging



PCR

