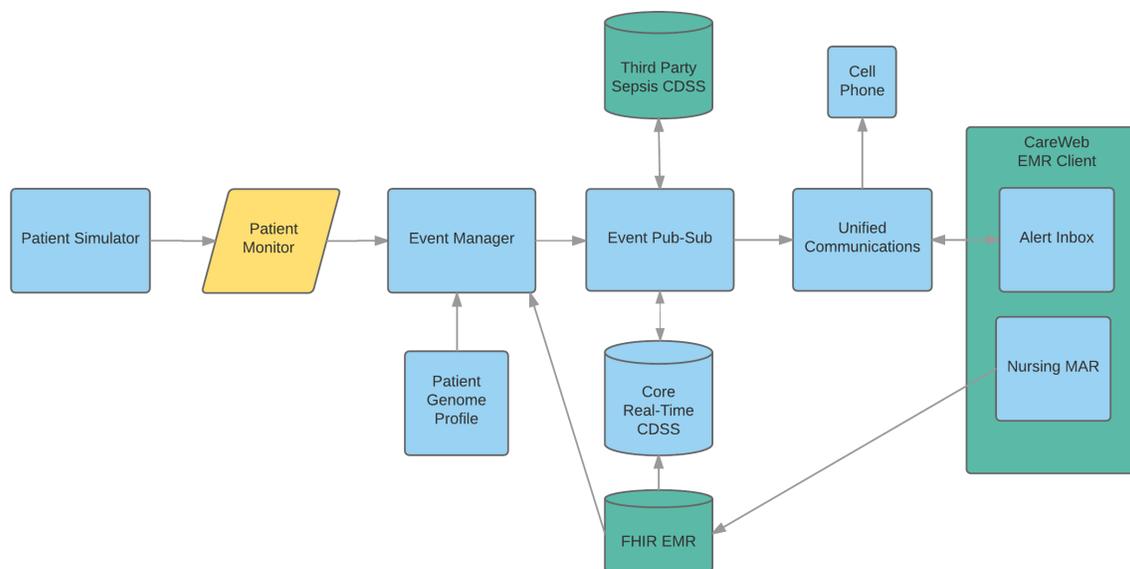


# ***Healthcare Services Platform Consortium (HSPC) Clinical Decision Support Demonstration***

HSPC advocates for standards-based services, data models, and open architecture. We believe that HL7, OMG, IHTSDO and others have established a foundation of health informatics standards that can be used to establish a services platform capable of solving real-world clinical problems today and enabling more elaborate capabilities in the future. Healthcare will eventually experience the same standardization of services that revolutionized the banking, airline, retail, manufacturing and e-commerce industries. This HSPC demonstration illustrates how standards, open architecture and collaborative research can make advanced cognitive support at the bedside a reality. The general system architecture is depicted below.



**Figure 1: Prototypic HSPC CDS Architecture**

The general context for the demonstration involves a hypertensive patient who is seriously injured in a car accident. He is admitted to a local intensive care unit and is being treated, among other things, with metoprolol for his essential hypertension. An HSPC-compliant Clinical Decision Support System (CDSS) monitors the patient's care and advises the clinical staff as they treat his injuries. The demonstration illustrates four separate use cases:

*Use Case #1: Several days into the hospitalization, the patient begins experiencing transient, but clinically significant (suboptimal) drops in systemic blood pressure that correlate with each metoprolol administration. Typically, these transient events might be managed by a dose and/or interval adjustment and the CDSS advises accordingly.*

*Use Case #2: Later that day, the CDSS gains access to the patient's genome profile. It determines that the patient is genetically predisposed to unpredictable responses to*

*Metoprolol. When the patient continues to have abrupt, medication-related drops in BP, it recommends substituting metoprolol with a more suitable alternative.*

*Use Case #3: Several days later the patient begins to experience blood pressure dips that are unrelated to medication administrations. The system consults a second CDSS, providing it relevant clinical data. This third party system responds that a sepsis workup is recommended, advice the core CDSS then relays to the provider.*

*Use Case #4: When the provider fails to acknowledge the sepsis alert within a specified period of time, the system escalates the message to the provider's cell phone. Upon receiving an appropriate HIPAA compliant text, the provider logs in, reviews the CDS advice, and ultimately accepts the recommendation.*

These use cases rely on several HL7 standards (Fast Healthcare Interoperability Resources [FHIR], Decision Support Service [DSS], Unified Communications [UCOM] and Event Publish & Subscribe [EPS]) to create and deliver real-time CDS advice to providers at the bedside. It also illustrates advanced capabilities such as dynamic routing of alerts using different communication channels (email, SMS, etc.), complex event processing of device waveforms, and service calls between distributed services.

## HSPC Collaborators

***Cognitive Medical Systems and EPS, UCOM, and the Reference Implementation*** - a specialist in standards-based clinical decision support solutions, Cognitive provided several open source services based on HL7 standards (FHIR, DSS, UCOM, and EPS).

***Regenstrief Center for Biomedical Informatics and CareWeb*** - The CareWeb Framework is an open source application development framework for building complex, richly interactive, web-based applications. Its Clinical Abstraction Layer supports the creation of clinical plugins that can interoperate with any FHIR compliant data provider.

***University of Utah and OpenCDS*** - OpenCDS is a multi-institutional, collaborative effort to develop an open-source reference implementation of the HL7 DSS standard that can be widely adopted to enable CDS at scale.

***Furore and Spark*** – Spark is an open source FHIR server and the engine behind Simplifier.net, the FHIR registry for conformance resources. Furore also supports the Microsoft .NET community through the official .NET FHIR API.

***Health Samurai and Aidbox*** – Aidbox is a platform as a service (PaaS) solution for developing products based on the HL7 FHIR standard. Aidbox is suitable for building mobile and web-applications handling healthcare data using the FHIR format.

HSPC sponsors, facilitates, and encourages a variety of working groups where the work of defining and documenting requirements, use cases, system architecture, etc. occurs. If you want to learn more, or even better, want to contribute to the CDS effort, please visit [www.hspconsortium.org](http://www.hspconsortium.org) and join the HSPC CDS Collaboratory Working Group.