

JASON Task Force Listening Session
Testimony from Cerner Corp
5 August 2014

Cerner's clients and partners are active partners in the development of Cerner's solutions. We believe there is value in creating an open environment allowing others to collaborate in developing the future of healthcare.

We believe the timing is right. The digitation of healthcare systems has the industry poised to reap the 2nd order effects. Reliable connectivity, web technologies, mobile/tablet devices, consumer devices, cloud infrastructures, open source and commodity components have lowered the technological barriers allowing productive capacity to disperse. "App Store" deployment and business models based on standard APIs, as suggested by the JASON report, have transformed other industries. We believe the time is right for this transformation to come to HIT.

We believe that large-scale EHR systems will come to be seen as "open platforms" that can support customization and edge extension using standards-based APIs and technologies. The platform implements the core clinical workflows, manages all clinical data, and implements regulatory compliance. Extensions, primarily in the form of "apps" and other API-based service integration will be used to expand beyond the core capabilities as necessary to cover the complexities of medicine in large health care settings.

Cerner is putting our efforts and investments in key strategies we believe are necessary for success.

- **Standards.** Open standards are required to allow for the safe, secure, and effective exchange of medical information. We need cooperative partnerships for the purpose of achieving a widely accepted set of standards.
- **Open Services.** Loosely coupled, standards-based services optimized for consumption encourage experimentation and reuse and will result in unanticipated and innovative solutions.
- **Extensible Applications.** The robustness of data requires rich user experiences, as users want to interact with the knowledge most relevant to them. Workflows must be extensible to allow these data-driven apps to provide the right information at the right time.
- **Innovation Ecosystems.** EHR platforms must supply the infrastructure for collaboration. We must empower community development by exposing data in a consistent well-defined way through development resources and collaboration toolkits while providing the infrastructure enablers to ensure the aggregate systems can be monitored and managed appropriately.
- **Business Models.** We need business model innovation that reduce barriers to entry and make it profitable for contributors to engage and stay engaged.

- **Governance.** Governance is key; we must take the time to get it right. We must find the right balance between openness and controlled deployments, between market incentives and regulatory controls.

How do you, or would you, define a "public" API (attributes and utility)?

At a minimum, a “public” API should be based on specifications that are published via some well-defined process and designed for external (non-vendor) consumption. Ideally, a “public” APIs will be based on an externally defined standard, though in some cases, the published API may need to be based on private specifications.

- The existence of a public API does not automatically imply that the public has a right to use the API. Additional licensing and certification (among other steps) may be required before access to a public API is granted. This is obviously very important for sensitive systems such as EHRs.
- We often use the term “open” instead of “public”, but same concerns would apply.
- In order to be useful, other artifacts should accompany a public or open API.
 - There should be complete documentation (Developer Resources) for each level of the API
 - Ideally, a “test bed” will accompany the API where the API can be tested, in a non-destructive manner, without exposing any patient identifying information.
 - Many public APIs will also include sample applications that provide a framework for proper use of the API.
 - Supports mechanism to assist developers in resolving issues
 - Licensing mechanisms to promote adoption and deployment to a client base.

Have you deployed, are developing, or are planning any of these types of API's and for what purpose (e.g., CCDA, basic MU content, PACS, medications, referrals, billing..)?

Clients are using the *Cerner Millennium* platform to automate and remove variance from highly integrated, complex clinical and business processes that are deeply embedded in their healthcare organizations. Millennium was built as an n-tier, service-oriented architecture with transactions ranging from course-grained to fine-grained (depending on the needs of the solutions and their abilities).

Cerner currently provides Millennium Web Services, a developer's toolkit that exposes transactions that interact with the Cerner Millennium® to enable the licensee to create custom web applications and to exchange information with Millennium.

Historically, the Millennium Services were first exposed via Cerner’s proprietary middleware layer rather than a standards-based protocol/transport. We relied on our proprietary API because at the time, existing “remote procedure call” tools didn’t meet our needs for scalability, performance, flexibility, and cost.

We have continually upgraded our proprietary API to use state of the art tools as they emerged. For example, we released “Millennium Objects” as a SOAP-based API, once that technology had matured. More recently, we have converted MillenniumObjects to expose a RESTful API more consistent with modern web standards. We also have renamed the product to be “Millennium Web Services” to reflect this evolution.

Cerner’s current Millennium Web Services are openly published, but reflect a proprietary design. Current API functionality includes query access to patient, provider, encounter, and clinical data objects, as well as to a few customized “write” transactions such as proposal of a new order.

Our strategy is to migrate Millennium Web Services to use the emerging HL7 FHIR protocol, as it evolves through the standards process. We have successfully piloted numerous FHIR services, including a demonstration at HIMSS 2014 that included a number of other back-end vendors and multiple “app” developers. We expect that even though FHIR is a very comprehensive API, there will remain a need for proprietary service exposure as well. Both standards-based and proprietary API will be provided to licensed customers.

The JASON proposal describes a broad range of potential benefits to a “public” API for EHRs. Cerner has chose to initially focus our “public api” on the vision of "substitutable apps" as first outlined by Kohane and Mandl in their 2009 New England Journal of Medicine article (<http://www.nejm.org/doi/full/10.1056/NEJMp0900411> .) Cerner plans to follow the SMART on FHIR app-integration approach (<http://smartplatforms.org/smart-on-fhir/>) in support of these “SMART app” extensions. FHIR is the key to this approach. FHIR is an emerging HL7 standard API (<http://www.hl7.org/implement/standards/fhir/>) which uses modern HTTP-based RESTful design to expose the core data structures ("resources") managed by comprehensive EHRs.

The SMART platform defines a simple way to securely embed HTML web-applications inside the EHR's workflow, using FHIR as the data channel to read and write data on behalf of the plugin app.

Cerner is also working with Intermountain Healthcare to enable the use of their Clinical Element Models (<http://www.clinicalelement.com/#/>) as a way to further profile the FHIR resources such that semantic interoperability between app and EHR is maximized.

Cerner is committed to ensuring that these core FHIR Profiles remain open to all vendors for use as standard Profiles. To that end, Cerner is collaborating with the Healthcare Services Platform Coalition (HSPC) to ensure that a vendor-neutral approach is followed in the development of the FHIR profiles.

Cerner also expects to see FHIR---based services used in support of more traditional service---oriented architectures (SOA.)"

Do these API's affect push or pull functionality?

Today, our Millennium Web Services API are "pull." The source system maintains and indexes data. When the destination system wants or needs the information, it must retrieve it from the source system. Either the source or the destination (or both) manages access/security.

We expect that our early implementations of FHIR services will also be predominantly "pull.", but we expect to see the emergence of FHIR services that support "push" capabilities, perhaps as manifest by a "publish/subscribe" data access pattern. These more complex services will emerge as our research and investigation into FHIR continues, *(The current DSTU (Draft Standard for Trial Use) FHIR specification only supports pull transactions, but we expect that future version will allow for subscription requests.)* As new information becomes available, the source system sends the information to the destination. It expects the destination system to maintain and index the information on receipt. The source system must trust the destination system to manage access/security appropriately

Are your API's bidirectional?

The majority of our existing services are read---only, but we do have some read/write services available at a discrete level. (For example, updates can be applied to simple allergies, problems, immunizations, medications, etc.) As our investment in mobile platforms increase we are enabling the more complex workflows to be exposed that were not easily encapsulated before. The orchestration of the medication process, documentation and care planning are among the capabilities we see value in exposing as an API.

What type of business agreements were developed prior to initiating the build?

The majority of our business agreements are negotiated directly with our clinical and revenue cycle clients or as a result of strategic alignment with 3rd party device/application vendors. These are special scope agreements put in place to innovate and partner.

In most cases we also encourage and allow our current EMR clients to extend and develop on the "edge", using our published APIs.

- **If you have an API, how do you manage patient identification across entities?**

We generally delegate the management of patient identity to the external system that is invoking our API. Most of our clients have some form of MPI that manages identity across their facilities.

However, given the emergence of population health projects, where patient identity needs to be managed across multiple independent facilities, Cerner is proud to have co-sponsored the creation of the CommonWell Health Alliance.

The CommonWell Health Alliance has defined and deployed national services using common standards and vendor-neutral approaches. Initial core components of the national infrastructure services include:

- **Identity Management.** Provide a way for HIT suppliers to quickly and accurately identify patients as they transition through care facilities.
- **Record Locator.** Help providers locate and access their patients' records, regardless of where the encounter occurred, by providing a "virtual table of contents" that documents available data from each encounter location.
- **Consent Management.** Deliver a patient-authorized means to simplify management of data sharing consents and authorizations
- **Trusted Data Access.** Provide authentication and auditing services that facilitate trusted data sharing among member systems.

These CommonWell Services align well with the JASON vision of external services that manage patient identity, track patient consent, and index the patients potentially distributed record. We think CommonWell could become a powerful asset to building on the JASON vision.

- **Does your API affect data extraction from discreet fields and the placing of that data into similar discreet fields in the receiving application?**
Yes, our APIs produce and accept data in sformats that exposes discrete fields. (EG: XML, JSON) The user of the API is free to manipulate the data as needed.
- **Does your API affect specific available data to be actively selected by the sender? By the requester?**

The intent of this question is unclear. The Millennium Web Service API allows for the requestor to specify the data elements that are of interest, via a query parameter. As described above, we do not currently support a "push" API other than the standard HL7 outbound interfaces that all EHRs support. As we move to support FHIR, we will expose all of the query capabilities that are defined in the relevant FHIR profiles.