



Partners in  
Interoperability™

# Cerner's Open Platforms

Accelerating a Community of Innovation  
with SMART on FHIR



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# Open Platforms Vision

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Cerner is accelerating health care innovation by enabling a broad community to amplify the power of its open platforms

# APIs enable apps for providers and consumers



Provider-facing apps can be developed that leverage the Millennium Platform using APIs



Government regulation requires more choices for consumer-facing apps via APIs



***Plan to attest for Meaningful Use Stage 3?***

The Ignite API for Millennium addresses *Objective 5, Measure 1*

# Emerging standards are making “apps” a reality



- FHIR = “Fast Health Interoperability Resources”
- A standard for accessing health care data (“Resources”)
- ReSTful API design leverages Internet standards (HTTP, etc.)
- Created by Health Level 7 International (HL7)
- Emerging support by most major HIT providers (e.g., Argonaut Project)
- Meets EHR Certification for MU3



- SMART = “Substitutable Medical Applications and Reusable Technology”
- A SMART App is a Web App
  - HTML5 + JavaScript
  - Typically embedded in EHR
- EHR Data Access is via FHIR
- OAuth2 for security and context passing
- Also supports smart-phone and patient-controlled apps

# Cerner's Ignite APIs fulfills MU3... and beyond...

## Why a cloud-based API?

- Industry compliant security architecture for internet facing applications
  - Centrally Managed Security (connection to internet, authentication and authorization)
  - Data management
- Agile deployment of updates and enhancements of FHIR standard
- Centralized ontology mapping
- Flexibility – scale capacity to meet application demand (predictable costs)

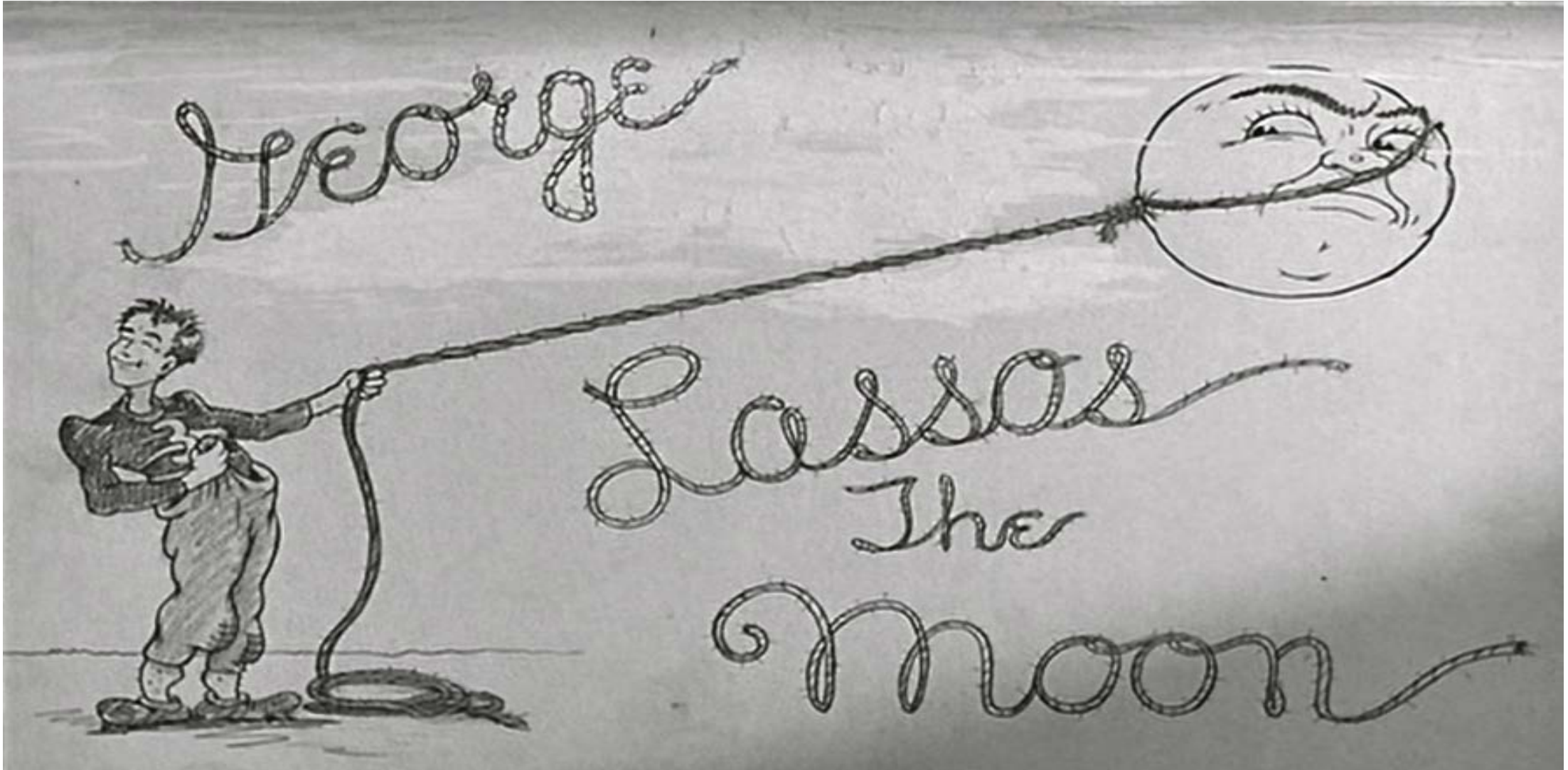


## Why FHIR?

- Standards-based API accelerates development community adoption
  - Common, web-based technology (REST, JSON, XML, OAuth)
  - Standardized data models (common, human readable set of data elements, “resources”)
  - Built in authentication and authorization model
  - ONC has suggested that FHIR may eventually be required



# George Lassos the Moon.....



# Resource Availability (as of 03/15/17)

## A-D:

- AllergyIntolerance 1
- Appointment 1
- AppointmentResponse 1
- AuditEvent 2
- Basic 1
- Binary 1
- BodySite 0
- Bundle 2
- CarePlan 1
- Claim 0
- ClaimResponse 0
- ClinicalImpression 0
- Communication 1
- CommunicationRequest 1
- Composition 2
- ConceptMap 2
- Condition (aka Problem) 2
- Conformance 2
- Contract 0
- DetectedIssue 1
- Coverage 0
- DataElement 1
- Device 1

## D-L:

- DeviceComponent 1
- DeviceMetric 1
- DeviceUseRequest 0
- DeviceUseStatement 0
- DiagnosticOrder 1
- DiagnosticReport 3
- DocumentManifest 1
- DocumentReference 2
- EligibilityRequest 0
- EligibilityResponse 0
- Encounter 1
- EnrollmentRequest 0
- EnrollmentResponse 0
- EpisodeOfCare 1
- ExplanationOfBenefit 0
- FamilyMemberHistory 1
- Flag 1
- Goal 1
- Group 1
- HealthcareService 1
- ImagingObjectSelection 1
- ImagingStudy 2
- Immunization 1

## I-P:

- ImmunizationRecommendation 1
- ImplementationGuide 0
- List 1
- Location 1
- Media 1
- Medication 1
- MedicationAdministration 1
- MedicationDispense 1
- MedicationOrder 1
- MedicationStatement 1
- MessageHeader 2
- NamingSystem 1
- NutritionOrder 1
- Observation 3
- OperationDefinition 1
- OperationOutcome 2
- Order 0
- OrderResponse 0
- Organization 1
- Parameters 1
- Patient 3
- PaymentNotice 0
- PaymentReconciliation 0
- Person 1

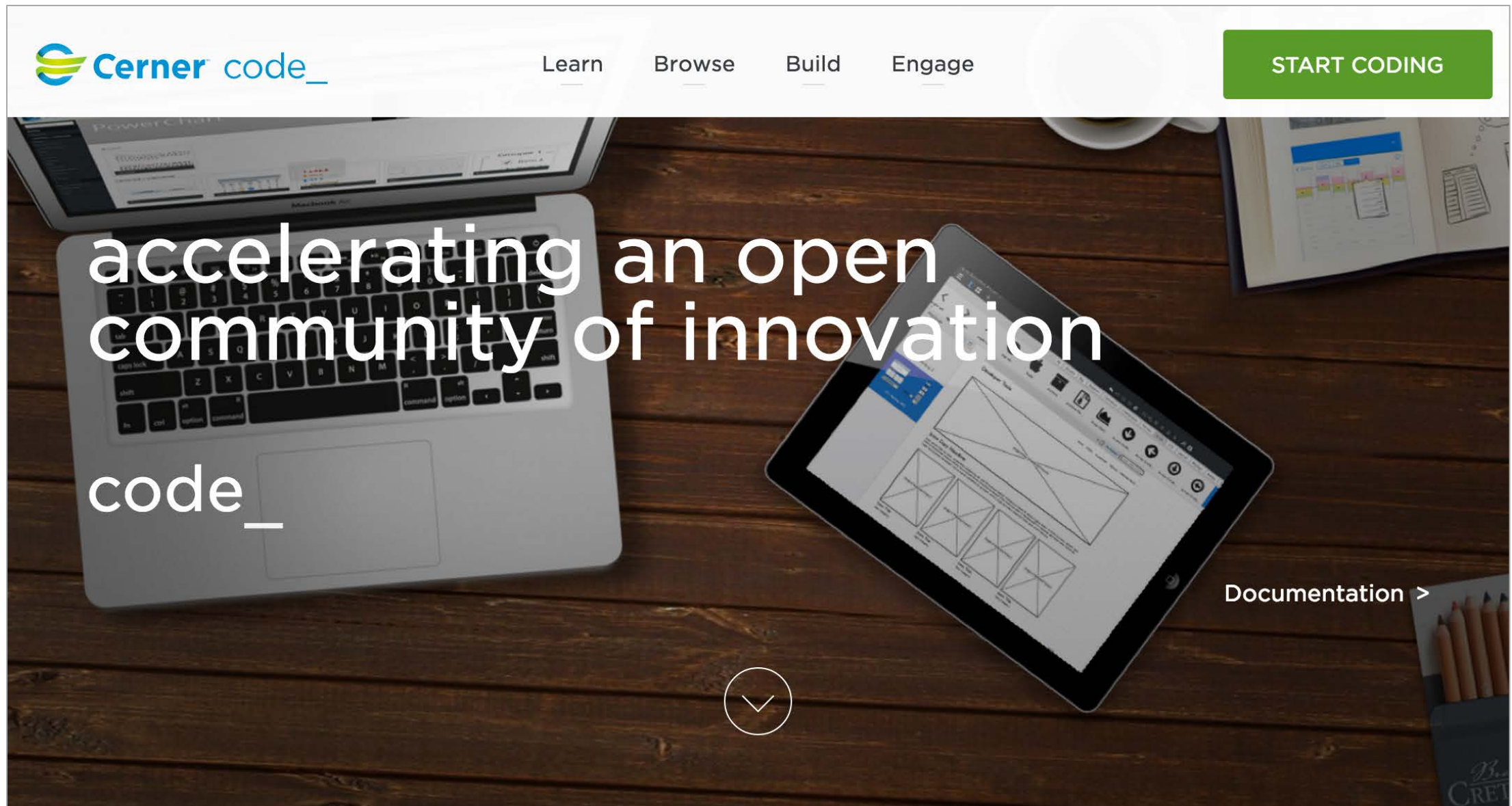
## P-Z:

- Practitioner 1
- Procedure 1
- ProcessRequest 0
- ProcessResponse 0
- ProcedureRequest 1
- Provenance 1
- Questionnaire 2
- QuestionnaireResponse 2
- ReferralRequest 1
- RelatedPerson 1
- RiskAssessment 0
- Schedule 1
- SearchParameter 1
- Slot 1
- Specimen 1
- StructureDefinition 2
- Subscription 1
- Substance 1
- SupplyRequest 0
- SupplyDelivery 0
- TestScript 0
- ValueSet 3
- VisionPrescription 0

 Current  
 Planned

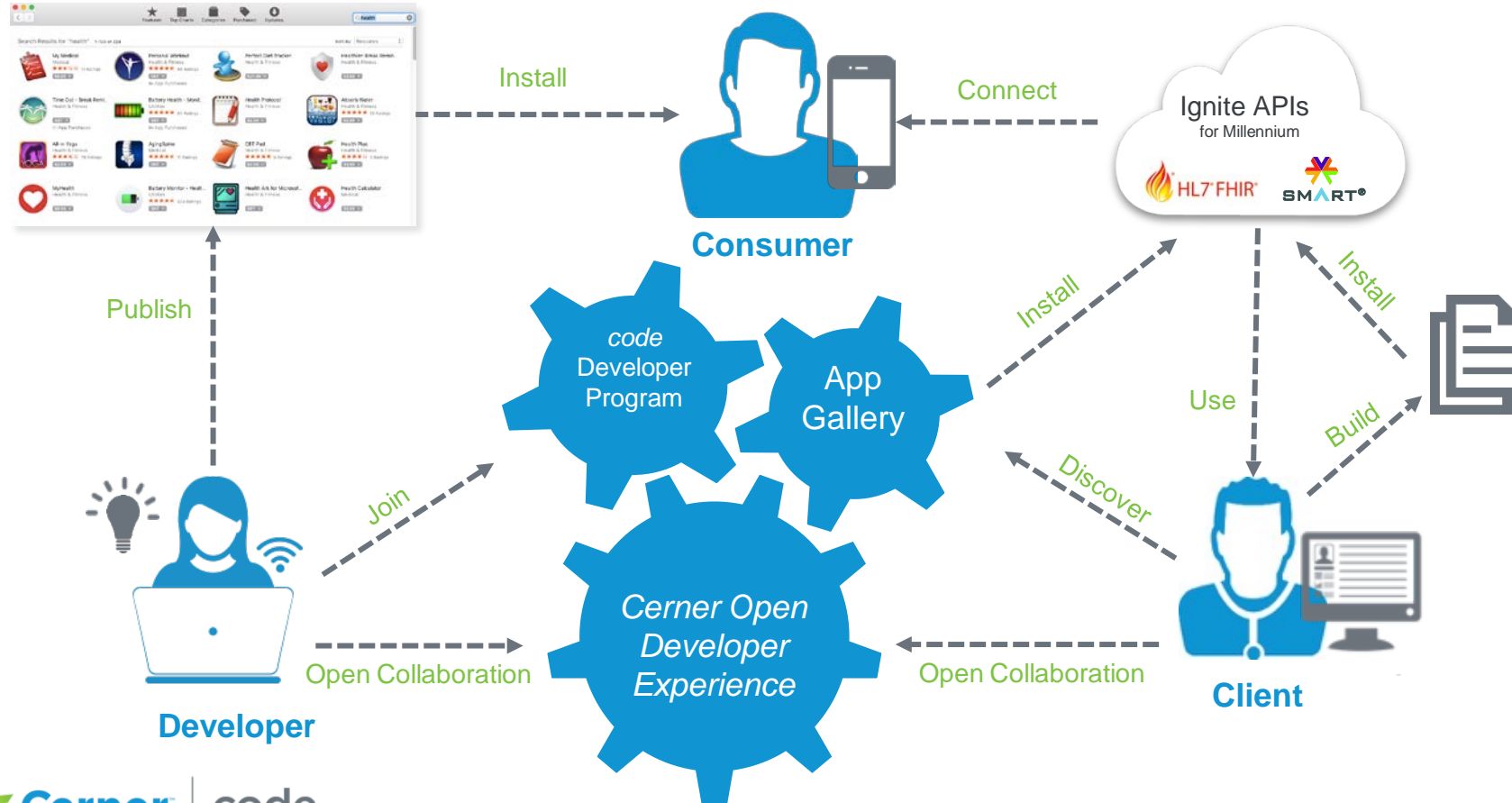


Cerner Open Developer Experience (code\_): <http://code.cerner.com>





# Cerner Open Platforms



- Apps registered on code.cerner.com: 1094 (139 patient-facing + 955 provider-facing)
- Free and open documentation of 18 FHIR API Resources.
- Starter app and tutorials
- Sandbox on actual Cerner EHR back-end for patient and provider-facing apps (over 300 registered apps)
- Active Google Group (Over 600 posts year-to-date). Cerner Engineers are highest contributors.



# Open Business Approach

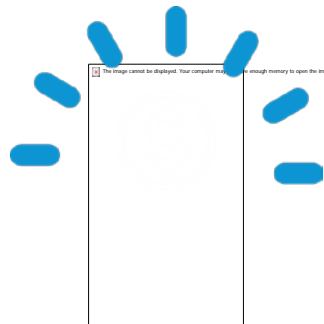
The culture that drives a **friendly business approach**, **allows extensibility** of our platforms and **enables a collaborative environment** that hastens innovation to advance health care.



## Access



## Trust



## Opportunity

# Developer Program Growth



COHERENT.RX

American Well®



HEART PATHWAY APP



visualdx®



meducation®



Rx  
REVU

- Advanced Surgical Care Coordination
- Optimize PreOp Resources
- Decrease Case Delays and Cancellations

**Test1, Byron** ✕

**Test1, Byron**  
Allergies: No Known Allergies  
IQHealth: No

PCP:  
Phone:  
Age: 31 years

DOB: 12/9/1984  
Wt:  
Sex: Male

Pref. Labs/Diagnostics:  
MRN: 10002751  
Emergency FIN: 20003478 [Admit Dt: 7/13/2015 8:33 AM] Loc: Baseline East, Baseline East

Full screen Print 0 minutes ago

**Menu**

- DHI Cardiac Risk
- ePreop**
- Clinical Notes + Add
- Document Viewing + Add
- Flowsheet
- Patient Information
- Diagnoses and Problems
- Orders + Add
- Histories
- Allergies + Add
- SMART Cardiac Risk 2.0
- SMART Cardiac Risk App DSTU2
- Cerner SMART App Validator
- SMART App Validator DSTU2

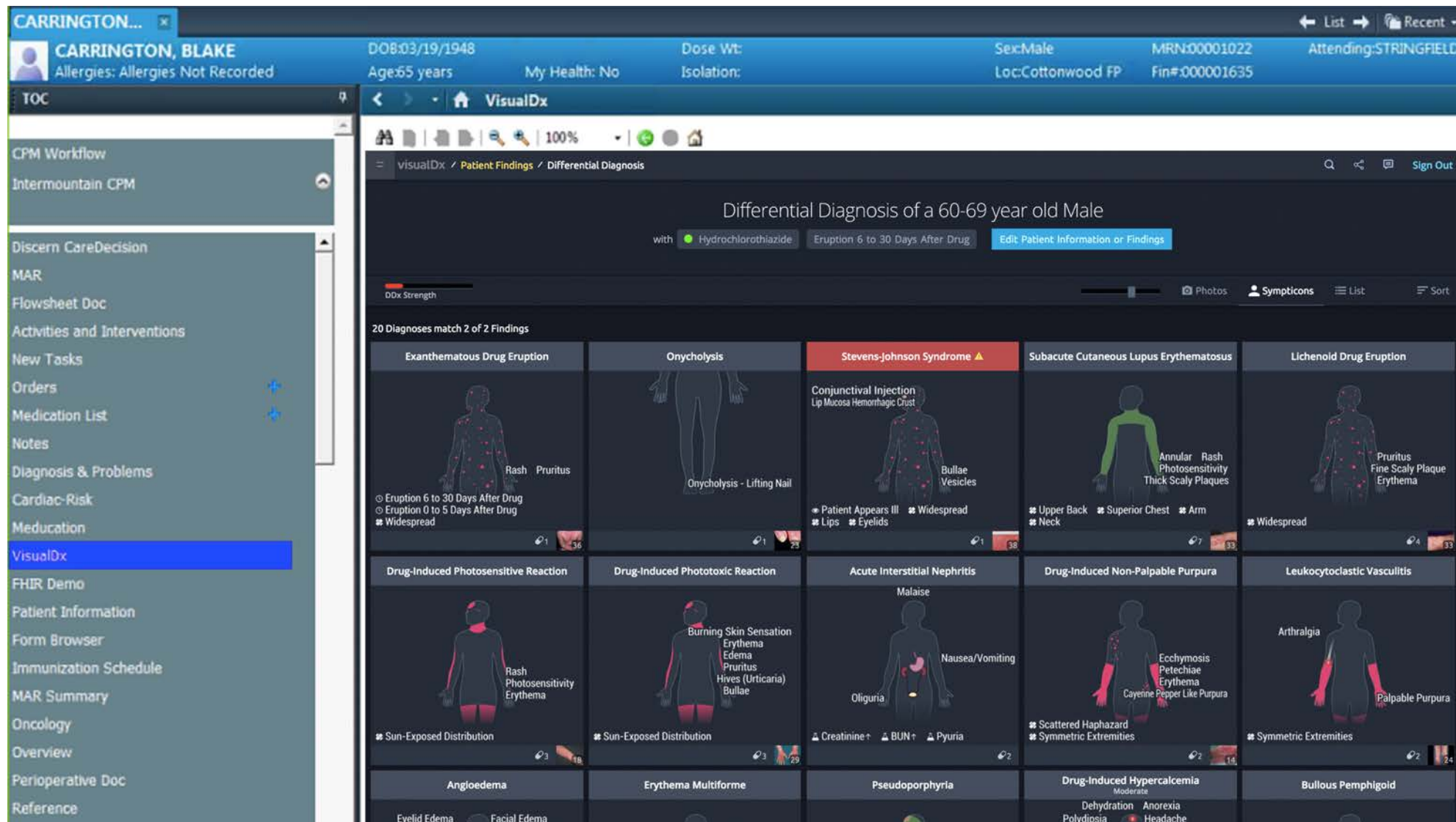
**Tracking Board**

Location  Date Range  Task  Provider

PATIENT	Surgery Date	Health Profile Received	Registered	Scheduled	Preop Clinical Review	Signed Preop Order	H&P	Preop Checklist Complete
<b>Moore, Mary</b> DOB: 1/1/1970 MRN: 908 Location: MAIN OR Procedure: APPENDECTOMY [44. Anesthesiologist: ANDERSON, MD	12/17/2014 11:45 AM CST	12/15/2014	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span> <a href="#">Review Intake</a>	<span style="color: gray;">●</span>	<span style="color: red;">●</span>	<span style="color: red;">●</span> <a href="#">View Checklist</a>
<b>Sanders, Alex</b> DOB: 6/9/1967 MRN: 847 Location: MAIN OR Procedure: HERNIA REPAIR W/.. Anesthesiologist: ANDERSON, MD Surgeon: LOUIS	12/17/2014 01:30 AM CST	12/15/2014	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span> <a href="#">Review Intake</a>	<span style="color: gray;">●</span>	<span style="color: red;">●</span>	<span style="color: red;">●</span> <a href="#">View Checklist</a>
<b>Smith, John</b> DOB: 7/7/1949 MRN: 1071 Location: MAIN OR Procedure: DECOMPRESS SPINA.. Surgeon: TEST SURGEON	12/17/2014 11:45 AM CST	12/15/2014	<span style="color: green;">●</span>	<span style="color: green;">●</span>	<span style="color: green;">●</span> <a href="#">Review Intake</a>	<span style="color: gray;">●</span>	<span style="color: red;">●</span>	<span style="color: red;">●</span> <a href="#">View Checklist</a>



- Developed by VisualDx
- Provides image-driven differential diagnosis
- Uses SMART for launching within PowerChart
- Uses FHIR to curate a tailored sub-set of images based on patient age, sex, and medication prescriptions



The screenshot displays the VisualDx app interface within a patient's chart. The top header shows patient information: CARRINGTON, BLAKE, DOB 03/19/1948, Age 65 years, Sex Male, Loc: Cottonwood FP, MRN: 00001022, and Fin#: 000001635. The left sidebar lists various clinical tools, with 'VisualDx' highlighted. The main content area is titled 'Differential Diagnosis of a 60-69 year old Male' and shows a list of 20 diagnoses matching 2 of 2 findings. The top diagnosis, 'Stevens-Johnson Syndrome', is highlighted in red and includes a visual representation of the skin condition with associated symptoms like conjunctival injection, lip mucosa hemorrhagic crust, and bullae/vesicles. Other diagnoses include Exanthematous Drug Eruption, Onycholysis, Subacute Cutaneous Lupus Erythematosus, Lichenoid Drug Eruption, Drug-Induced Photosensitive Reaction, Drug-Induced Phototoxic Reaction, Acute Interstitial Nephritis, Drug-Induced Non-Palpable Purpura, Leukocytoclastic Vasculitis, Angioedema, Erythema Multiforme, Pseudoporphyria, Drug-Induced Hypercalcemia, and Bullous Pemphigoid. Each diagnosis is accompanied by a visual representation of the condition on a human figure and a list of associated symptoms.

# Monitor Ignite APIs for Millennium

- Monitor application usage
- Identify highly used and adopted applications
- Transparency to Ignite API performance

## Applications

with at least one API Call over the past 30 days

23

## Average Daily Application Users

with at least one API Call over the past 30 days

39

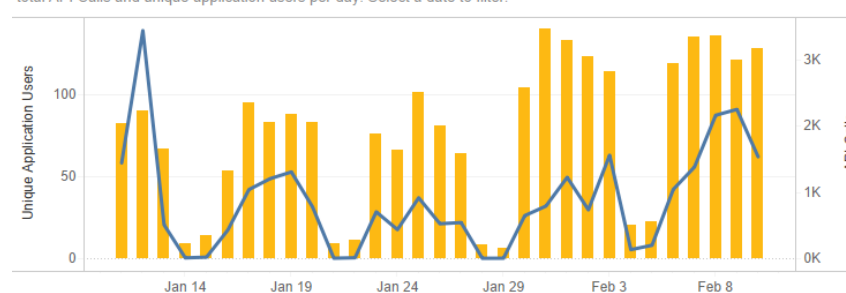
## API Calls

total API Calls over the past 30 days

27,286

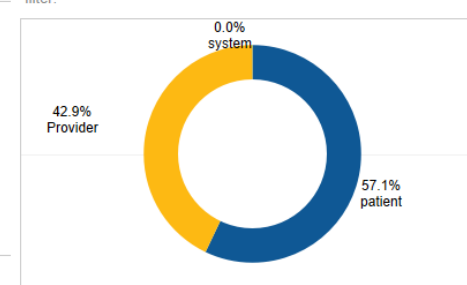
## 30 Day Trend of API Calls and Application Users

total API Calls and unique application users per day. Select a date to filter.



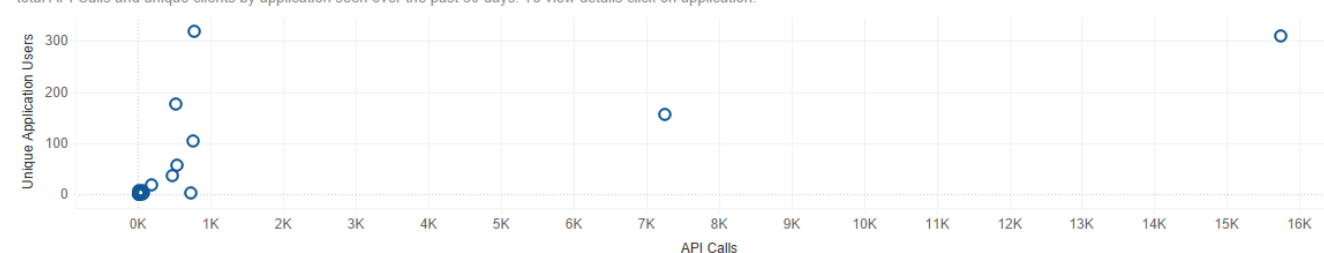
## User Types

% of user types seen over the past 30 days. Select a user type to filter.



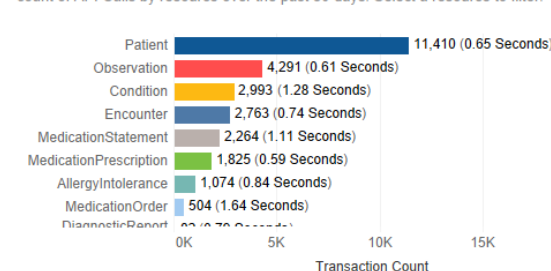
## Adoption by Application

total API Calls and unique clients by application seen over the past 30 days. To view details click on application.



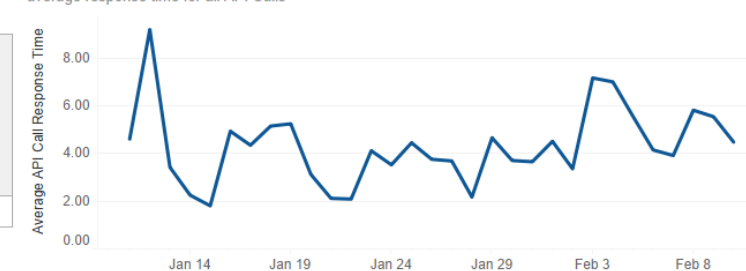
## Resources

count of API Calls by resource over the past 30 days. Select a resource to filter.



## 30 Day Trend of Average API Call Response Time (in seconds)

average response time for all API Calls



# Analyze Individual Application

- Understand application adoption and usage
- Discover top users
- Identify application usage and audience patterns
- Track application performance

Note: Dashboard will not display data unless an application has been selected previously. Please return to the Summary tab and select an application.

**Application**  
ePreop SurgicalValet

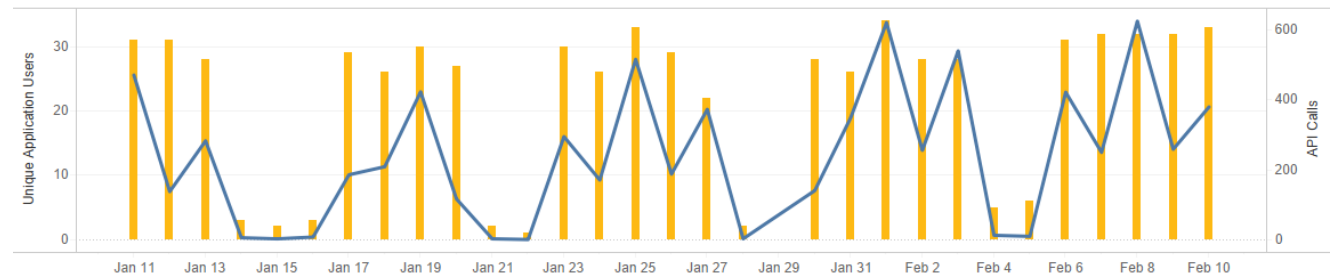
**Average Daily Application Users**  
with at least one API Call over the past 30 days

5

**API Calls**  
total API Calls over the past 30 days

7,260

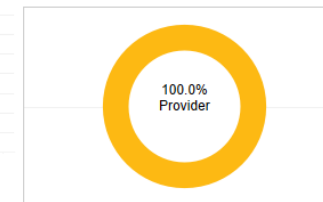
**30 Day Trend of API Calls and Application Users**  
total API Calls and unique application users per day. Select date to filter.



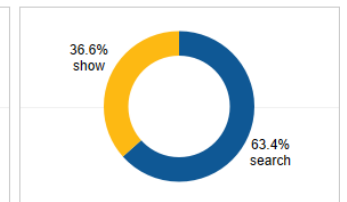
**30 Day Trend of Average API Call Response Time (in seconds)**  
average response time for all API Calls. Select date to filter.



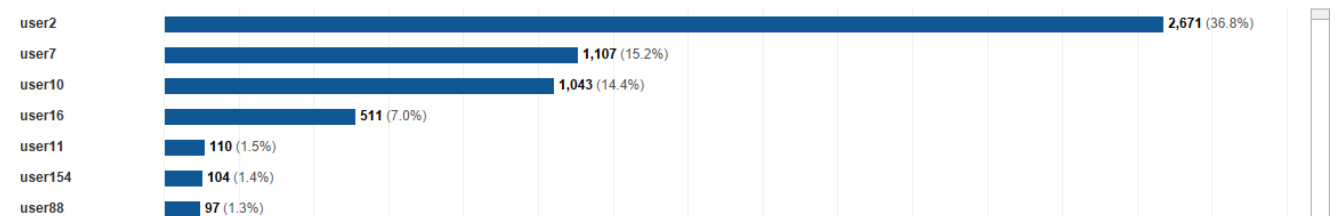
**User Types**  
API Calls by user type seen over the past 30 days.  
Select a user type to filter.

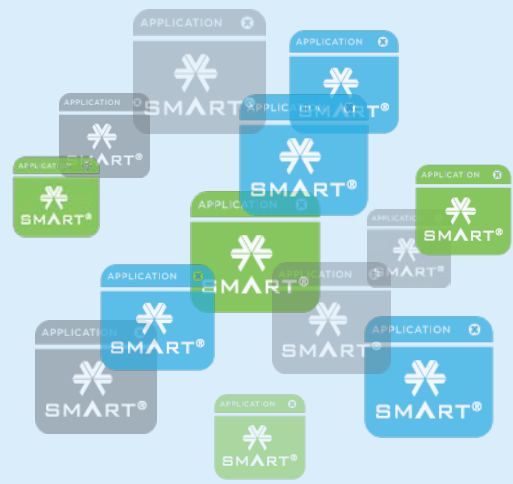


**User Actions**  
% of user action types seen over the past 30 days.  
Select an action to filter.

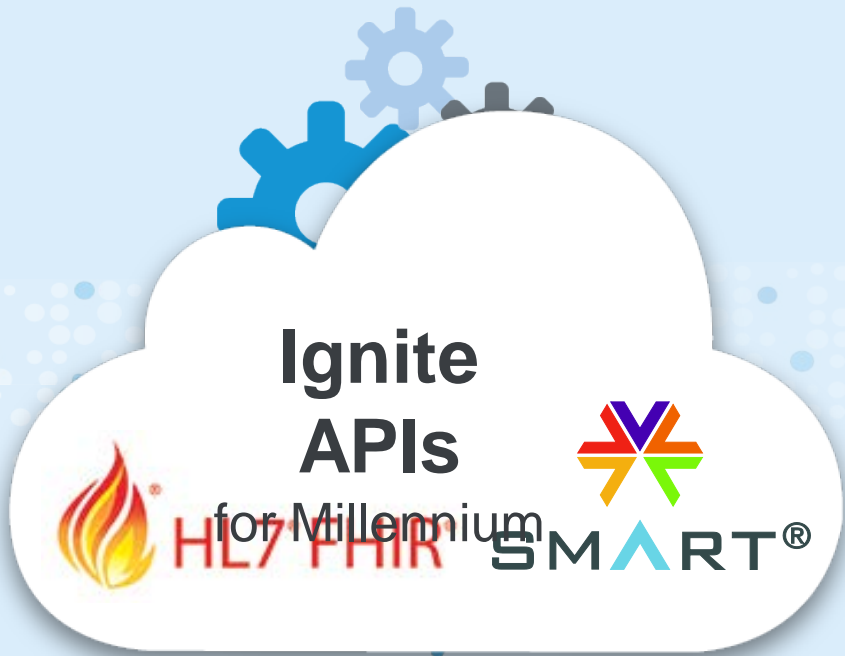


**Top Users by API Calls**  
total API Calls and % of all API Calls by user

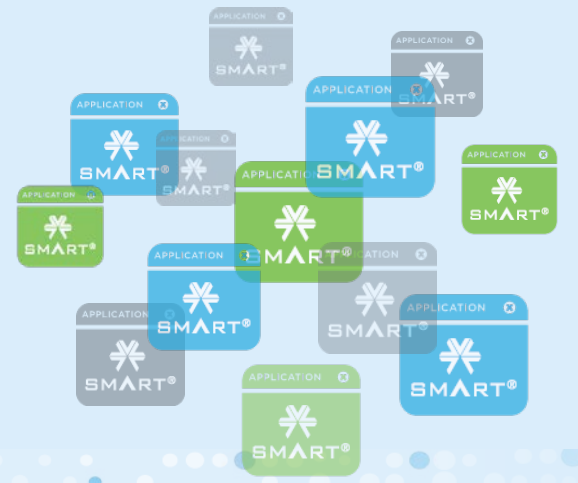




Consumer



Millennium®



Provider

