



Partners in  
Interoperability™

# Cerner's Open Platforms

Accelerating a Community of Innovation  
with SMART on FHIR



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# Open Platforms Vision



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)

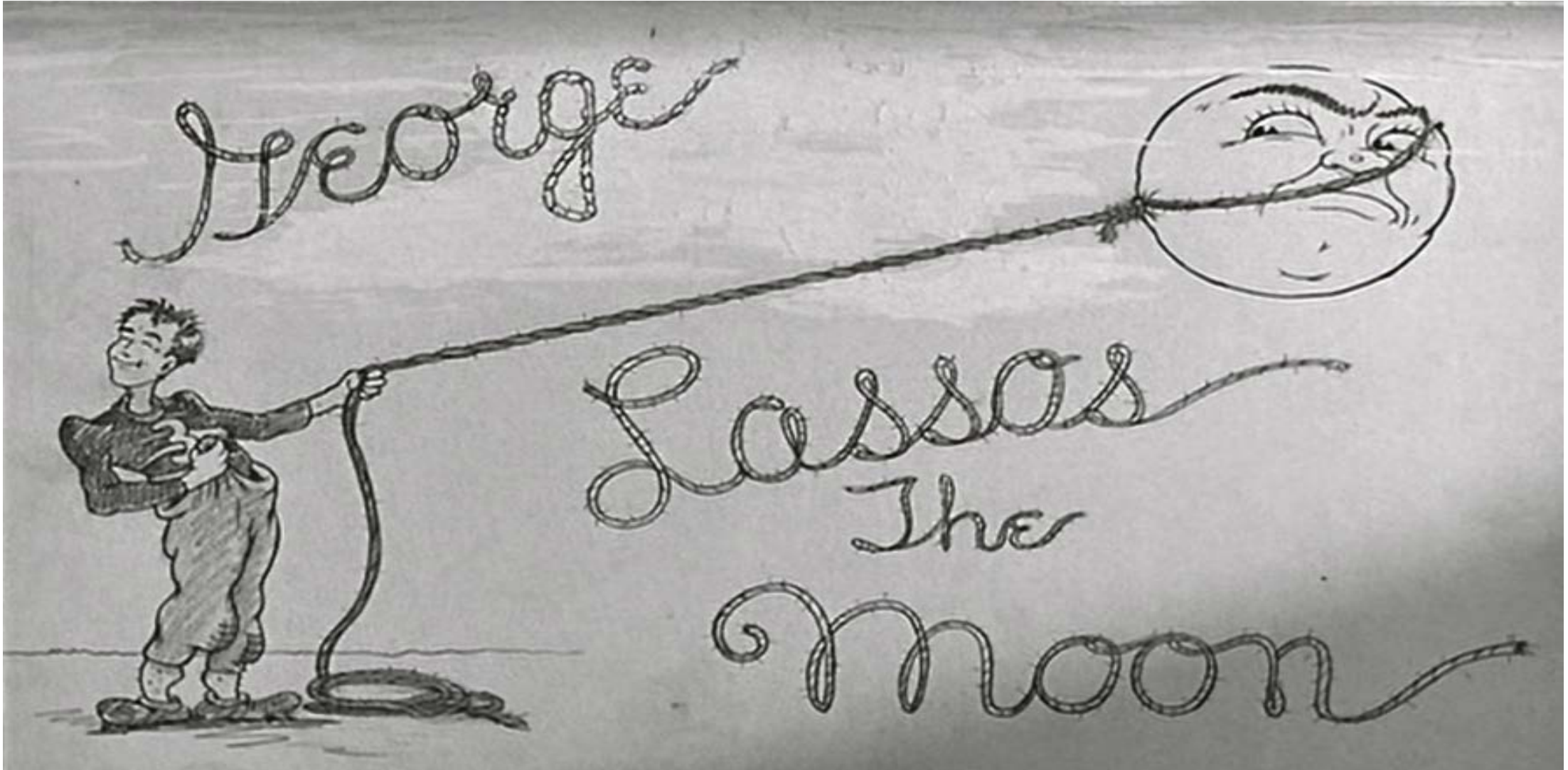


## Why FHIR?

- 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

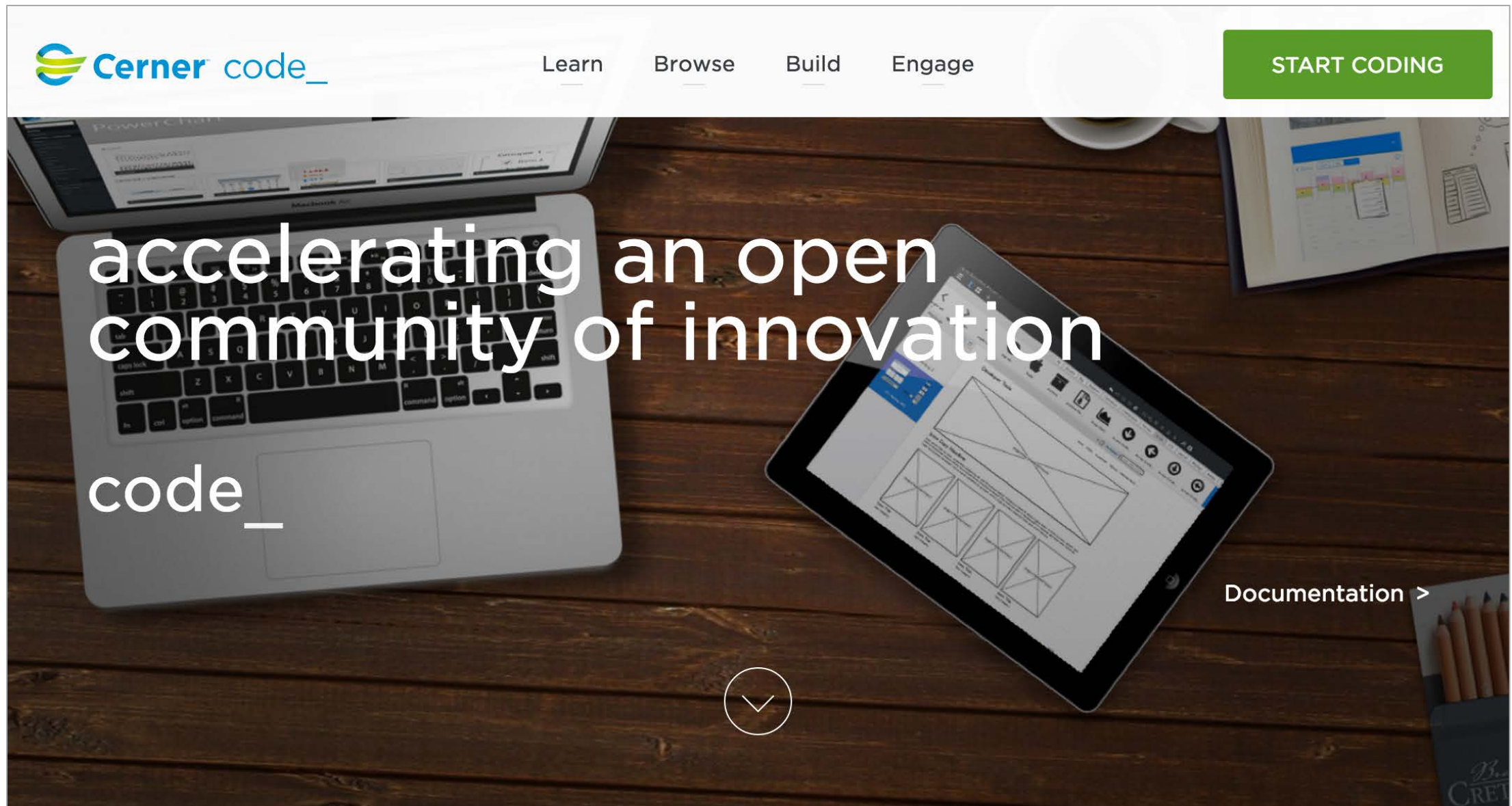
## P-Z:

- 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

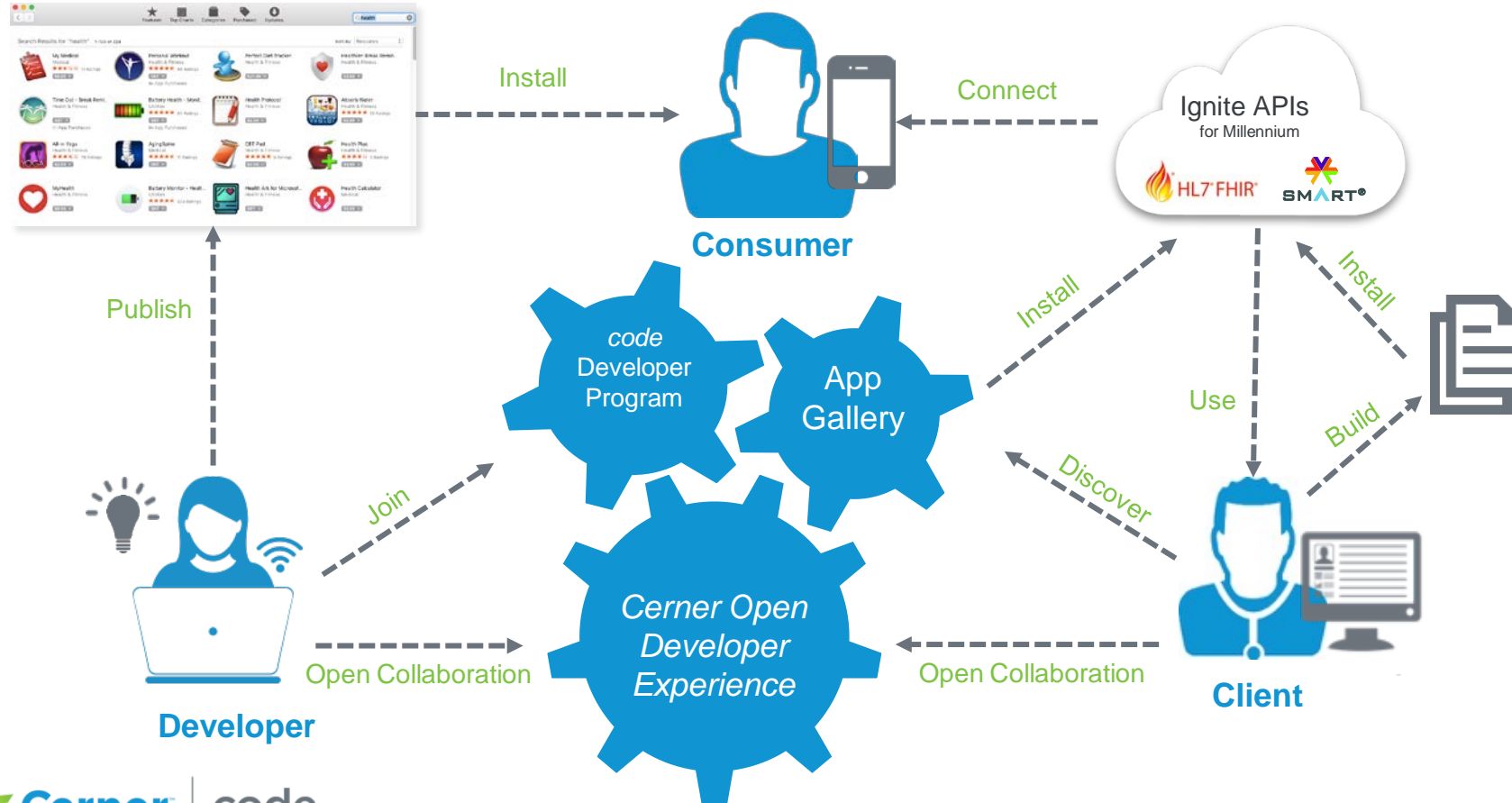


Cerner Open Developer Experience (code\_): <http://code.cerner.com>





# 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

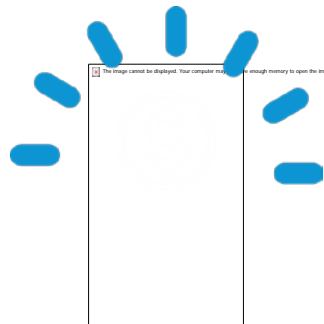
The culture that drives a **friendly business approach**, **allows extensibility** of our platforms and **enables a collaborative environment** that hastens innovation to advance health care.



## 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

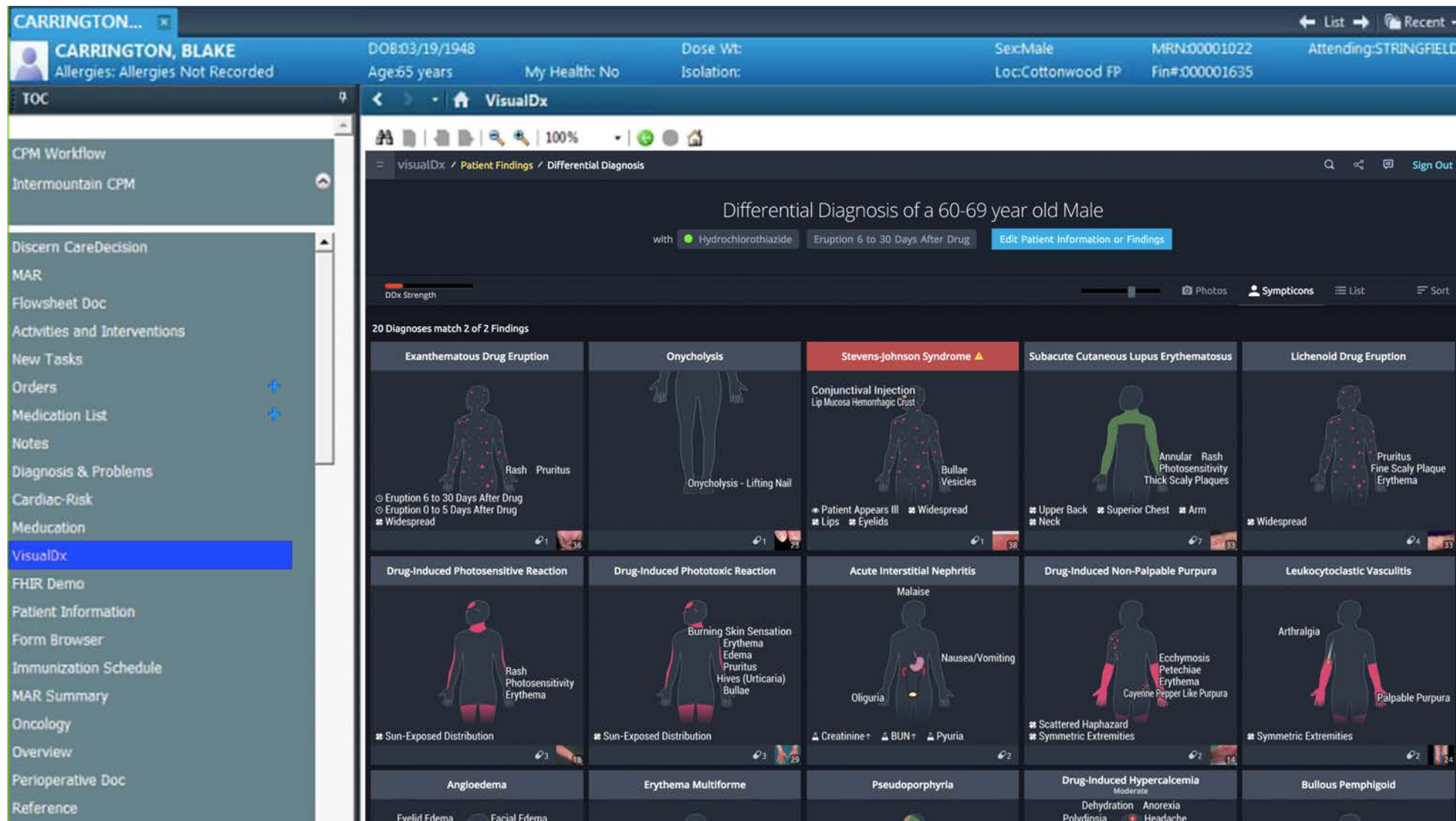
**Tracking Board**

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 for CARRINGTON, BLAKE, DOB 03/19/1948, Age 65 years, Sex Male, and MRN 00001022. The left sidebar lists various clinical tools, with 'VisualDx' highlighted. The main content area shows a 'Differential Diagnosis of a 60-69 year old Male' for a patient on Hydrochlorothiazide, with an eruption 6 to 30 days after drug administration. The interface displays 20 diagnoses matching the findings, with 'Stevens-Johnson Syndrome' highlighted as the top match. The diagnoses are presented in a grid, each with a body map showing the distribution of symptoms and associated clinical findings.

Exanthematous Drug Eruption	Onycholysis	Stevens-Johnson Syndrome	Subacute Cutaneous Lupus Erythematosus	Lichenoid Drug Eruption
Rash, Pruritus Eruption 6 to 30 Days After Drug Eruption 0 to 5 Days After Drug Widespread	Onycholysis - Lifting Nail	Conjunctival Injection, Lip Mucosa Hemorrhagic Crust, Bullae, Vesicles Patient Appears Ill, Widespread, Lips, Eyelids	Annular Rash, Photosensitivity, Thick Scaly Plaques Upper Back, Superior Chest, Arm, Neck	Pruritus, Fine Scaly Plaque, Erythema Widespread
Drug-Induced Photosensitive Reaction	Drug-Induced Phototoxic Reaction	Acute Interstitial Nephritis	Drug-Induced Non-Palpable Purpura	Leukocytoclastic Vasculitis
Rash, Photosensitivity, Erythema Sun-Exposed Distribution	Burning Skin Sensation, Erythema, Edema, Pruritus, Hives (Urticaria), Bullae Sun-Exposed Distribution	Malaise, Nausea/Vomiting, Oliguria Creatinine+, BUN+, Pyuria	Ecchymosis, Petechiae, Erythema, Cayenne Pepper Like Purpura Scattered Haphazard, Symmetric Extremities	Arthralgia, Palpable Purpura Symmetric Extremities
Angioedema	Erythema Multiforme	Pseudoporphyria	Drug-Induced Hypercalcemia	Bullous Pemphigoid
Eyelid Edema, Facial Edema			Moderate, Dehydration, Anorexia, Polydipsia, Headache	

# 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

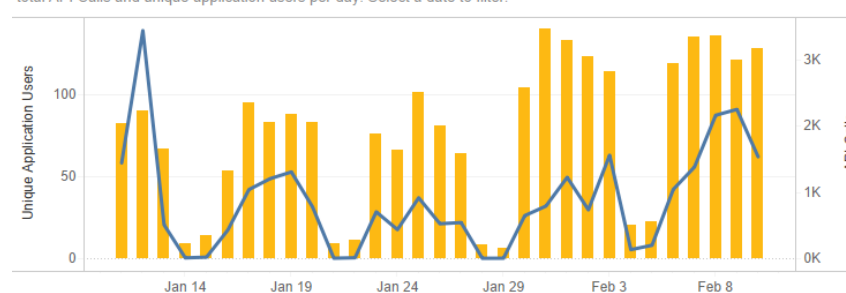
## API Calls

total API Calls over the past 30 days

27,286

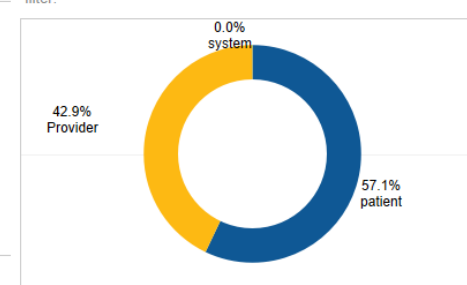
## 30 Day Trend of API Calls and Application Users

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



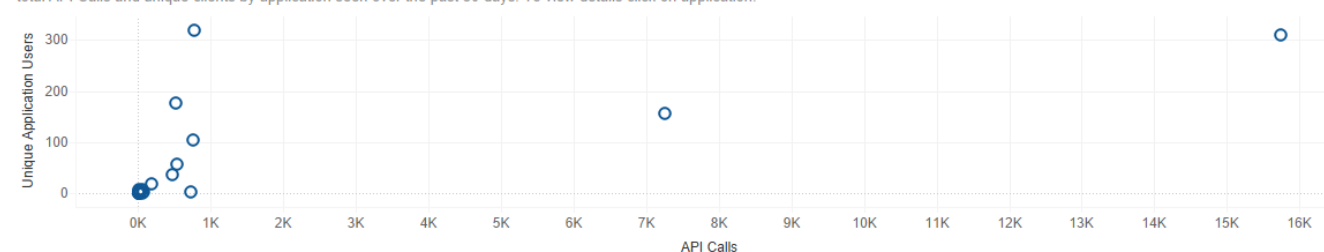
## User Types

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



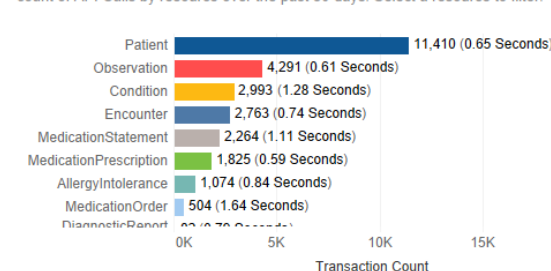
## Adoption by Application

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



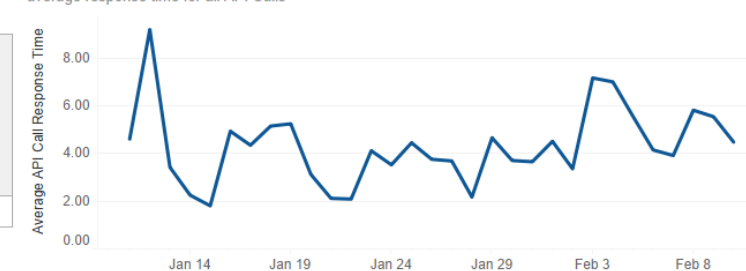
## Resources

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

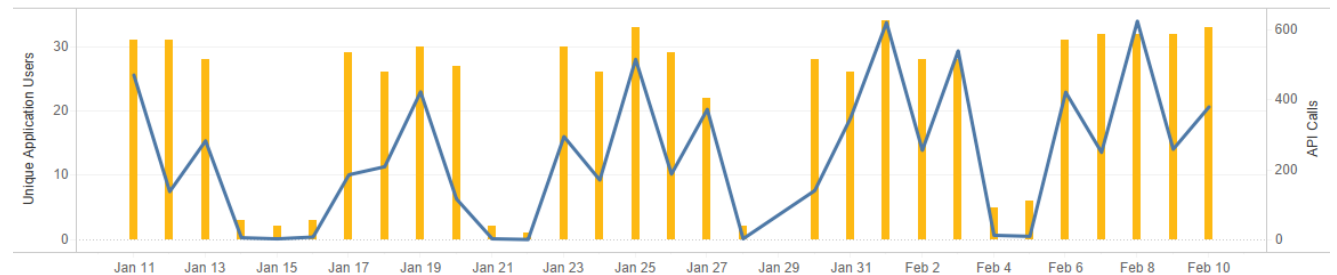
5

**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.



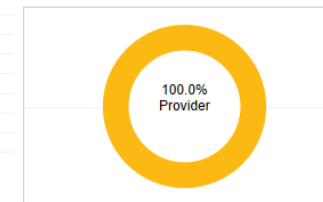
## 30 Day Trend of Average API Call Response Time (in seconds)

average response time for all API Calls. Select date to filter.



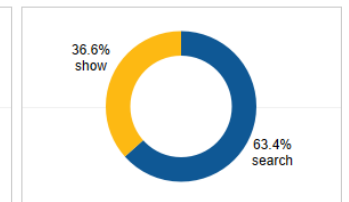
## User Types

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



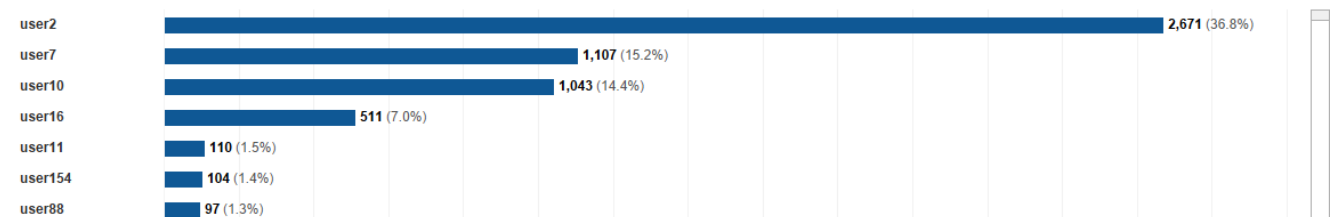
## User Actions

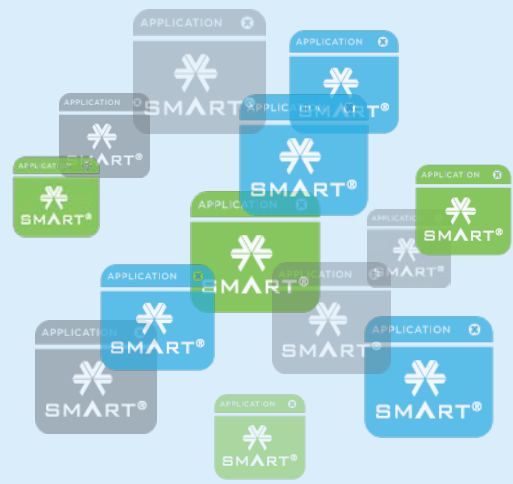
% of user action types seen over the past 30 days.  
Select an action to filter.



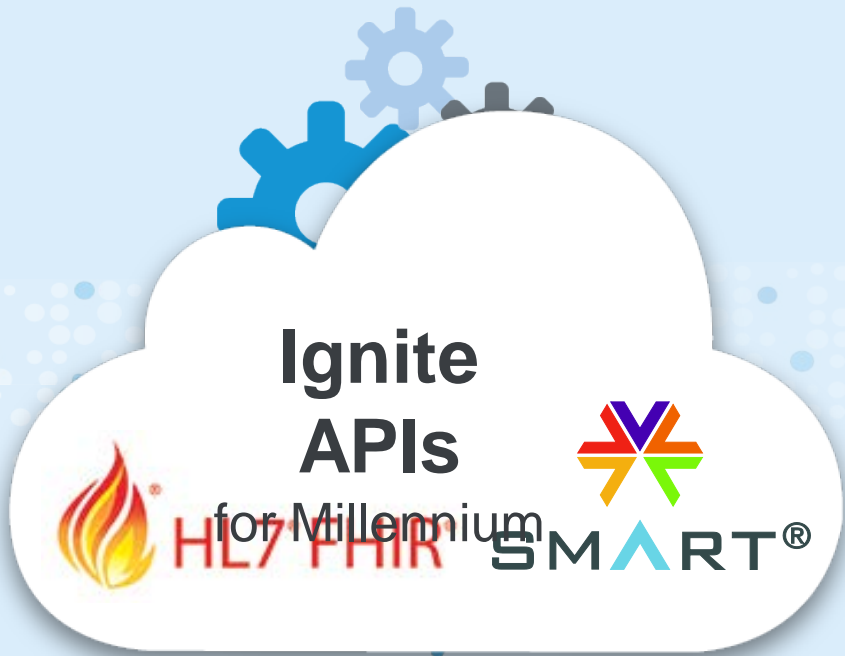
## Top Users by API Calls

total API Calls and % of all API Calls by user

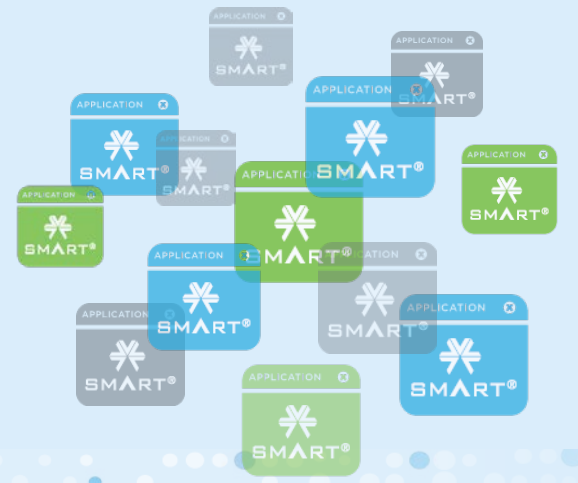




Consumer



Millennium®



Provider

