



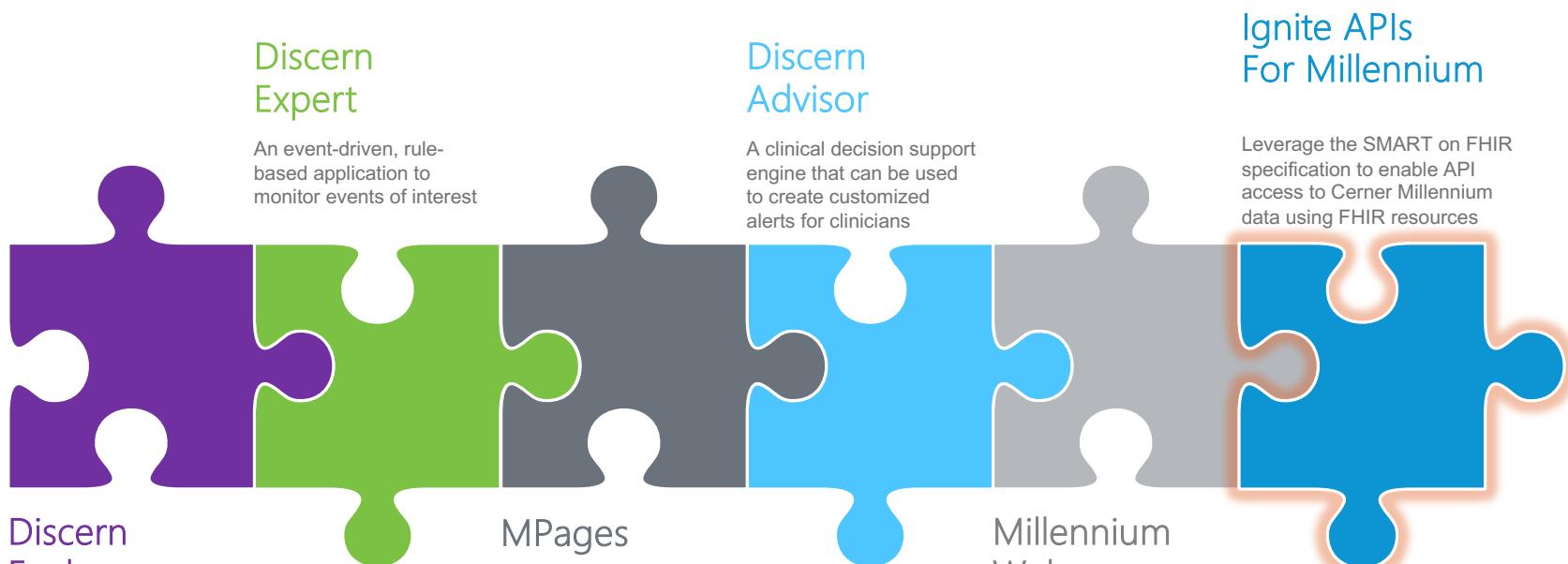
Cerner
**code Learning
Lab** 2019

Putting It All Together

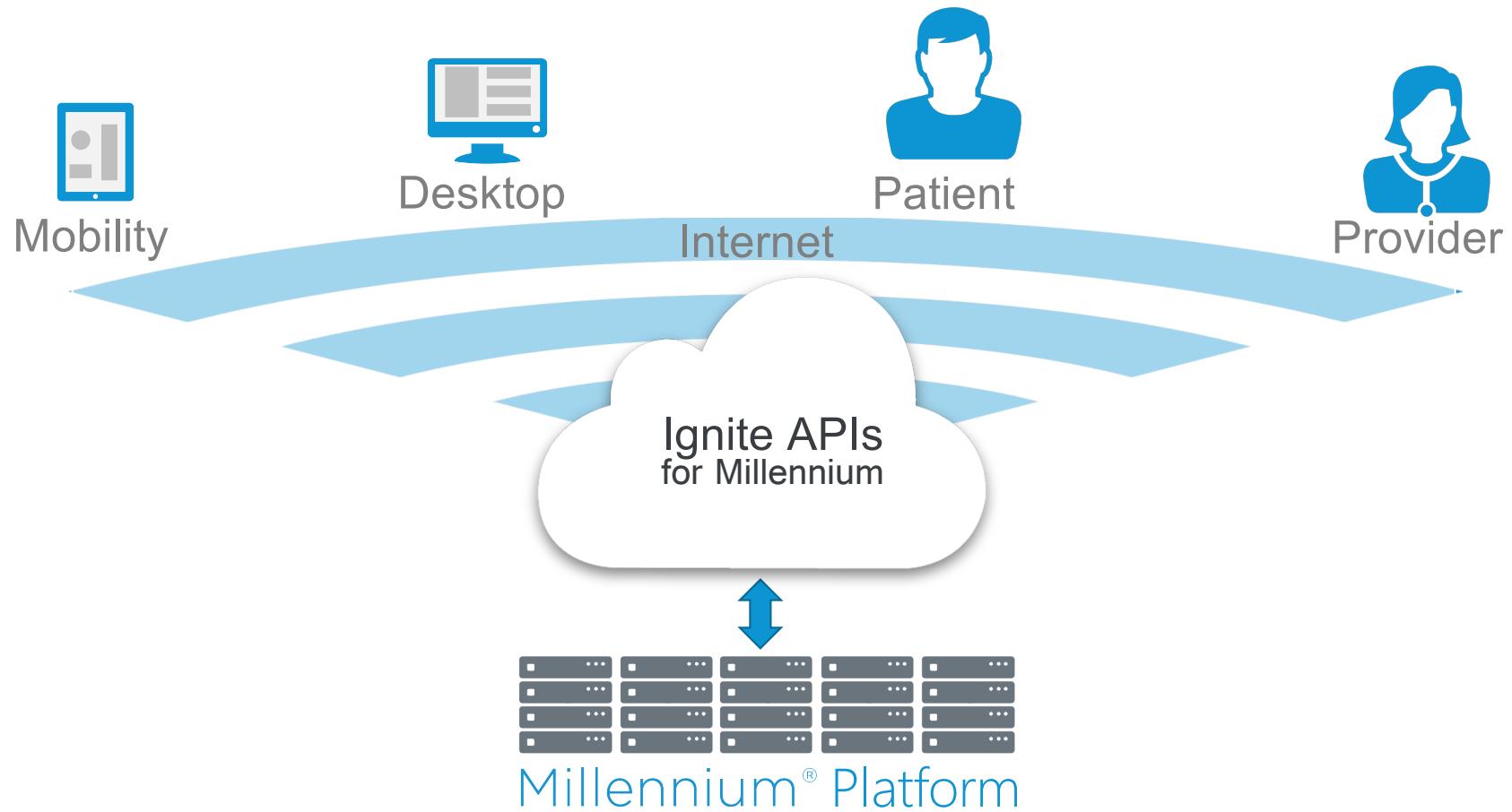
Eric Sornson
Sr. Engineering Manager



Solutions & Levels of Extensibility



Cerner Ignite APIs for Millennium



Benefits of a cloud-based API

- Centrally Managed Security (internet, authentication and authorization)
- Consistent API experience for all clients
- Rapid, agile deployment of updates and enhancements of FHIR standard
- Centralized proprietary code standardization mapping
- Flexibility – scale capacity to meet application demand (predictable costs)

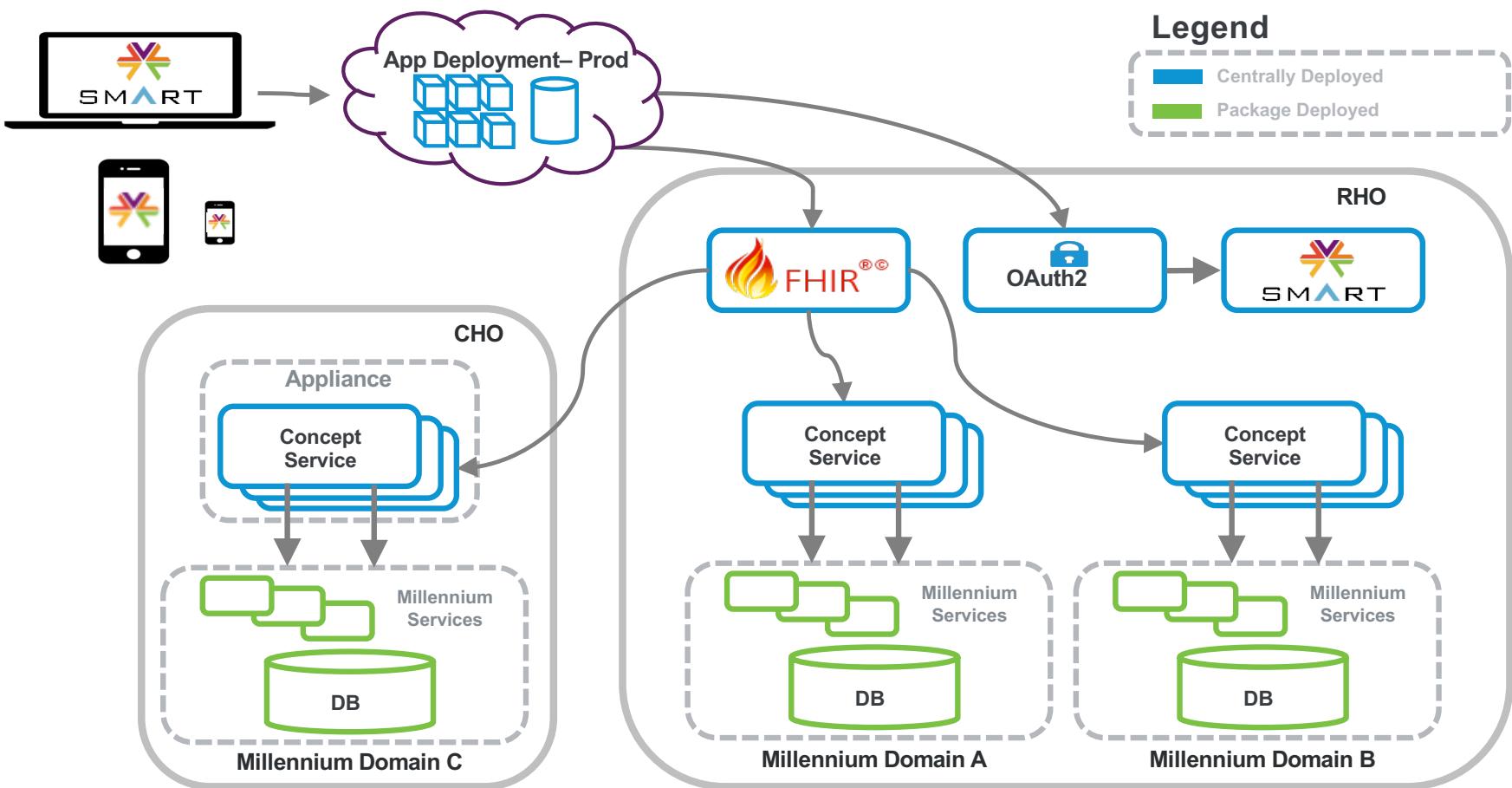
Ignite APIs
for Millennium

Consumer

Provider

Millennium®

Ignite API Open Platform Architecture

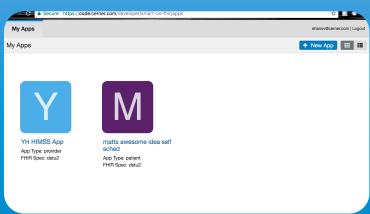


Ecosystem Growth



Capabilities

- SMART Launch Points
- FHIR Resources
- Access Methods



Developer Tooling

- Robust Documentation
- Application Management
- Proprietary APIs to complement standards



API Management

- Access Provisioning
- Access Monitoring
- API Gateway

Monitor Ignite APIs for Millennium



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Lights On Network®
Transforming Data into Knowledge and Action

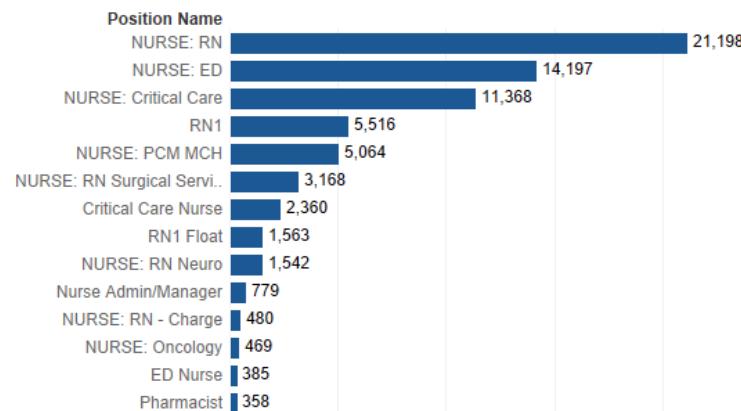
App Adoption by Facility and Position

Medication (DSTU 2)
Unique Providers: 2,514
Application Launches: 67,088

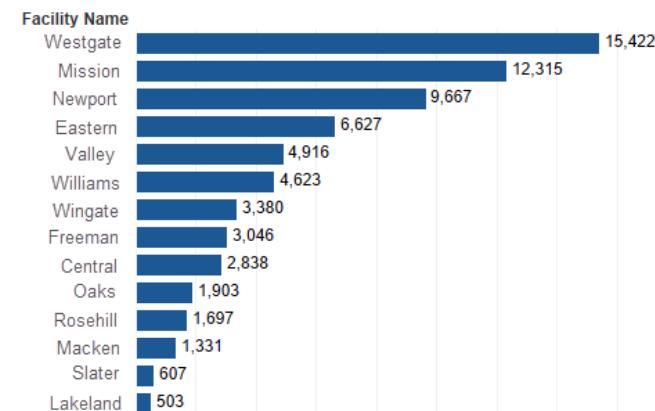
Unique Providers



Unique Application Launches by Position
(select position to filter)

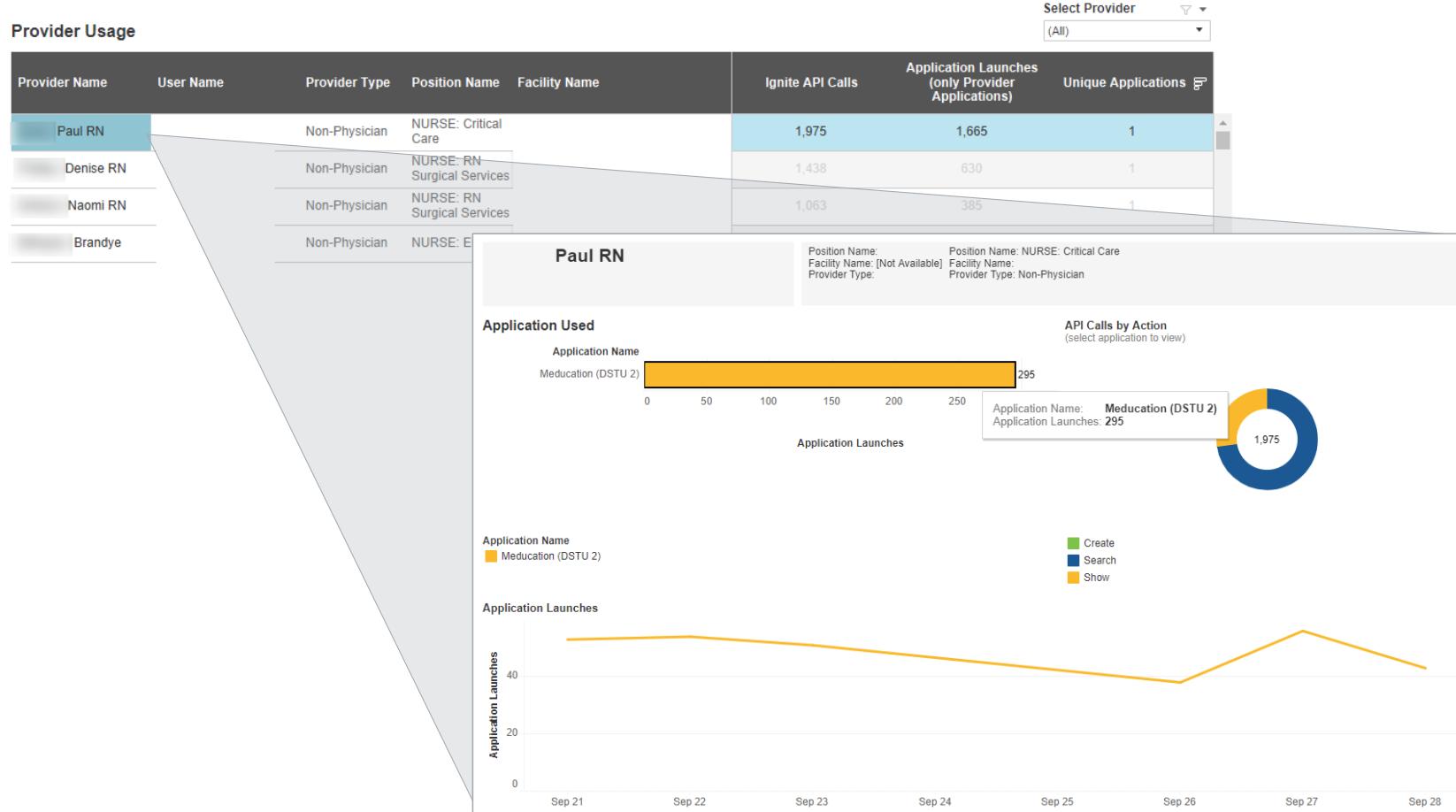


Unique Application Launches by Facility
(select facility to filter)



Provider Details

Provider Usage



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Common Issues

Common Issues

- FHIR Spec Maturity & Gaps
- App Hosting & Access to External Resources
- EMR integration
- Proprietary Code Standardization Mappings



History

Publication (Version) History

This table provides a list of all the versions of FHIR (Fast Health Interoperability Resources) that are available. See also the directory of [FHIR Implementation Guides](#).

The following versions of the FHIR Specification have been published:

Date	Version	Description
Current Versions		
2018-12-27	4.0.0	FHIR Release #4: First Normative Content
(current)	(last commit)	Current Development build (about 30min behind version control, may be incoherent and change rapidly)
R4 Sequence (Current)		
2018-12-27	4.0.0	FHIR Release #4: First Normative Content (<i>Permanent Home</i>)
2018-11-09	3.5a.0	Special R4 Ballot #3 : Normative Packages for Terminology / Conformance + Observation
2018-08-21	3.5.0	R4 Ballot #2 : Mixed Normative/Trial use (Second Normative ballot + Baltimore Connectathon)
2018-04-02	3.3.0	R4 Ballot #1 : Mixed Normative/Trial use (First Normative ballot)
2018-04-02	3.2.0	Draft for comment / First Candidate Normative Content
STU 3 Sequence (Historical)		
2017-04-19	3.0.1	FHIR Release 3 (STU) with 1 technical errata (Permanent Home) <i>Technical Errata Archive (zip): v3.0.0</i>
2016-12-06	1.8.0	FHIR STU3 Candidate + Connectathon 14 (San Antonio)
2016-08-11	1.6.0	FHIR STU3 Ballot + Connectathon 13 (Baltimore)
2016-03-30	1.4.0	CQF on FHIR Ballot + Connectathon 12 (Montreal)
2015-12-11	1.2.0	Draft for comment
2015-12-03	1.1.0	GAO Ballot + draft changes to main FHIR standard
DSTU 2 Sequence (Historical)		
2015-10-24	1.0.2	DSTU 2 (Official version) with 1 technical errata (Permanent home)
2015-08-31	1.0.0	DSTU 2 QA Preview + CQIF Ballot (Sep 2015)
2015-04-02	0.5.0	DSTU 2 Ballot version (May 2015 Ballot)
2014-12-12	0.4.0	Draft For Comment (January 2015 Ballot)
DSTU 1 Sequence (Historical)		
2014-09-30	0.082	DSTU 1 (Official version) with 2 technical errata (Permanent home)
2013-09	0.11	DSTU 1 Ballot version
2012-12-04	0.06	2nd Draft for Comment (January 2013 Ballot)
2012-09-09	0.05	1st Draft for Comment (Sept 2012 Ballot)

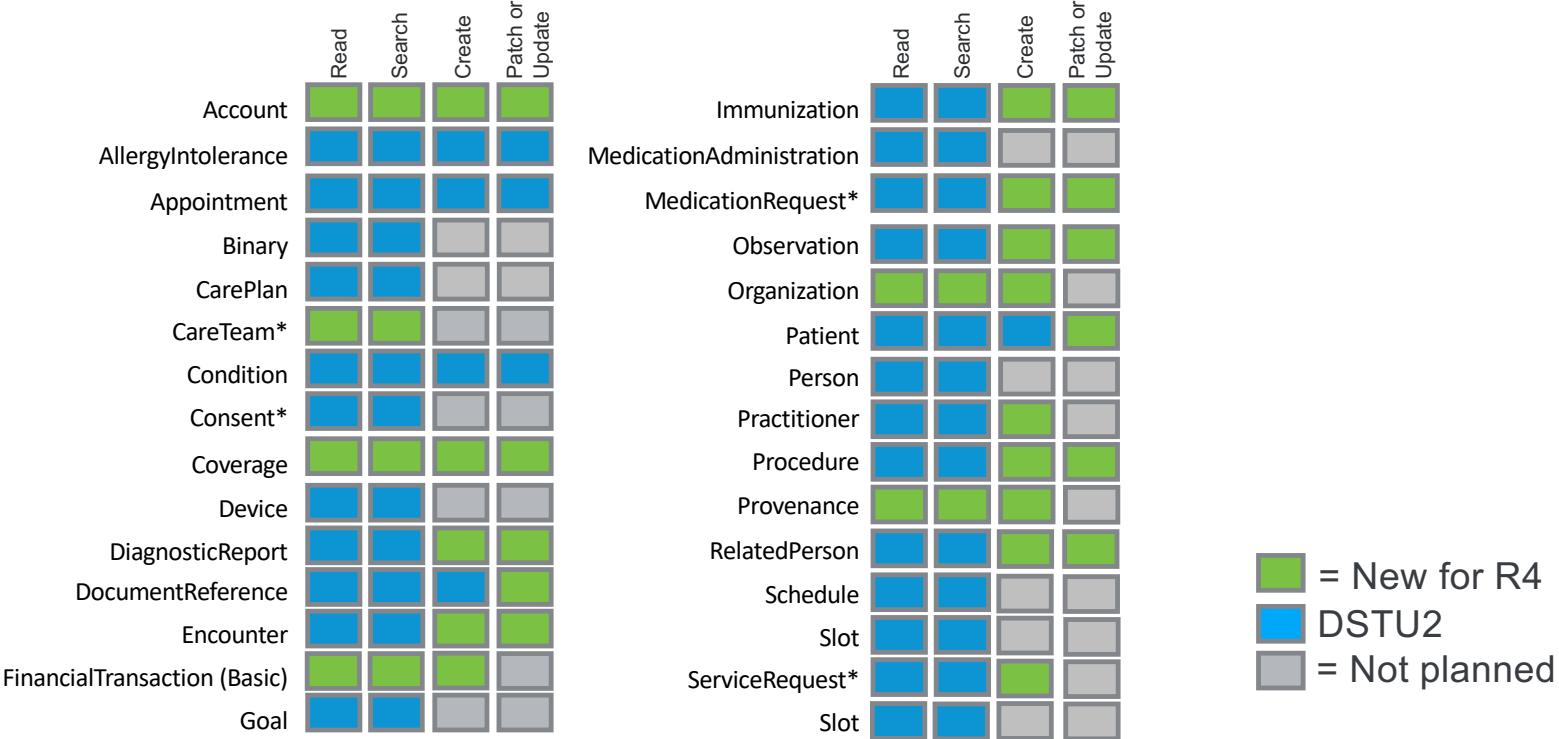
Future Release?

← Current Prod Release (limited resources)

← Current Production Release (MU3)

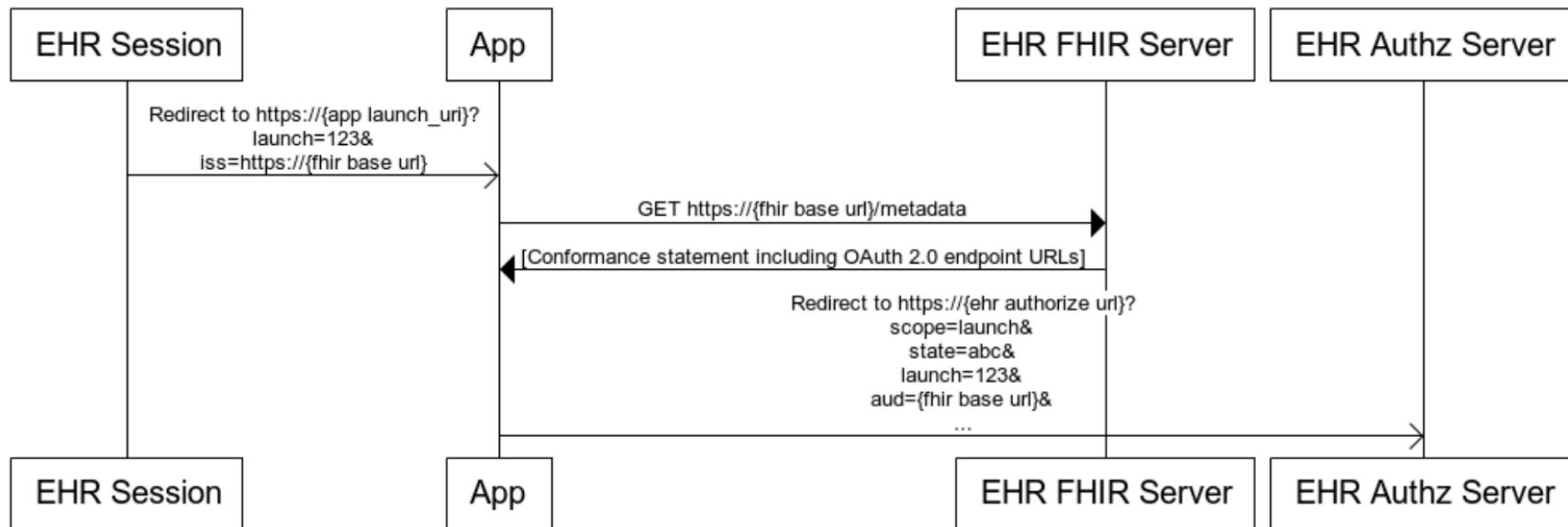
← Original Release (now retired)

DSTU2 vs R4?

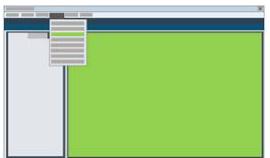


ISS parameter + metadata

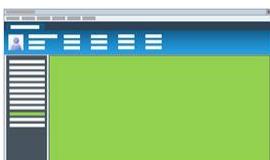
EHR launch sequence <http://docs.smarthealthit.org/authorization/>



SMART App Integration



- PowerChart Organizer View



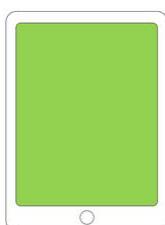
- PowerChart Patient's Chart



- PowerChart MPage

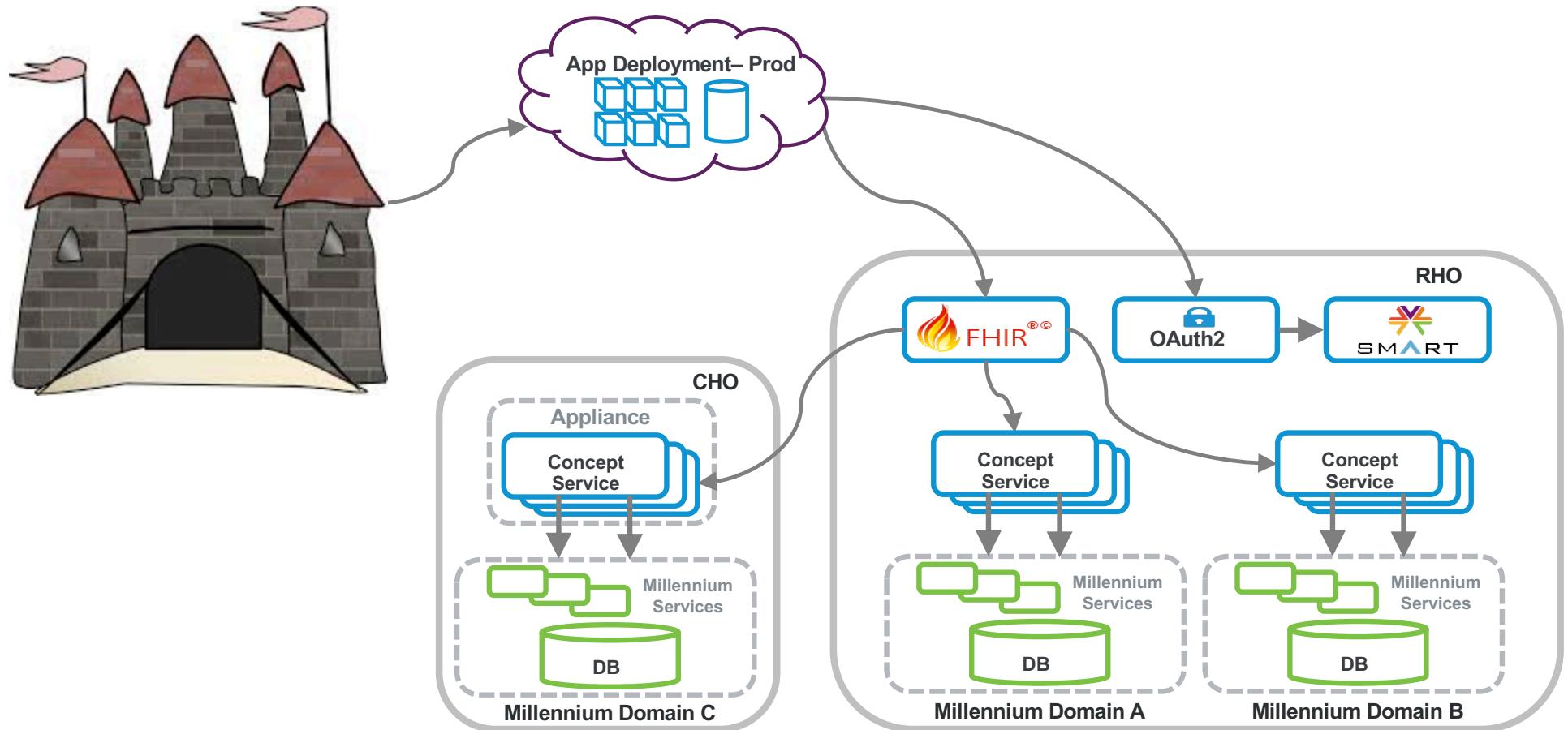


- HealtheLife Patient Portal



- Standalone Web or Mobile app

Application Deployment & Access



Proprietary Code Standardization Mapping

Cerner Ontology mappings bridge the gap between proprietary codes stored in Millennium and standardized codes defined and referenced by the HL7 FHIR specification



Concept Mapping Example (Med Order Status Code)

Millennium, Code Set 6004

- CANCELED
- COMPLETED
- DELETED
- DISCONTINUED
- FUTURE
- INCOMPLETE
- INPROCESS
- MEDSTUDENT
- ORDERED
- PENDING REV
- UNSCHEDULED
- TRANS/CANCEL
- PENDING
- VOIDEDWRSLT
- SUSPENDED

<http://hl7.org/fhir/medication-order-status>

- **active**
- **on-hold**
- **completed**
- **entered-in-error**
- **stopped**
- **superceded**
- **draft**

Concept Mapping Example (Med Order Status Code)

Outbound Mappings:

Millennium >>> FHIR

ORDERED, PENDING (Pending Complete) >>> active

SUSPENDED >>> on-hold

COMPLETED >>> completed

DELETED, VOIDEDWRSLT >>> entered-in-error

CANCELLED, DISCONTINUED, TRANS/CANCEL >>> stopped

FUTURE, MEDSTUDENT, INCOMPLETE >>> draft



Concept Mapping Example (Med Order Status Code)

Inbound Mappings:

FHIR >>> Millennium

active >>> ORDERED

on-hold >>> SUSPENDED

completed >>> COMPLETED

entered-in-error >>> DELETED

Stopped >>> DISCONTINUED

draft >>> INCOMPLETE



Concept Mapping Example (Growth Chart)



Concept Mapping Example (Growth Chart)

Event Sets *(Cerner Millennium)*

Weight

Event Codes *(Cerner Millennium)*

Weight (Dosing)

Weight

Weight Estimated (Non Dosing)

Growth Chart Weight

LOINC Codes

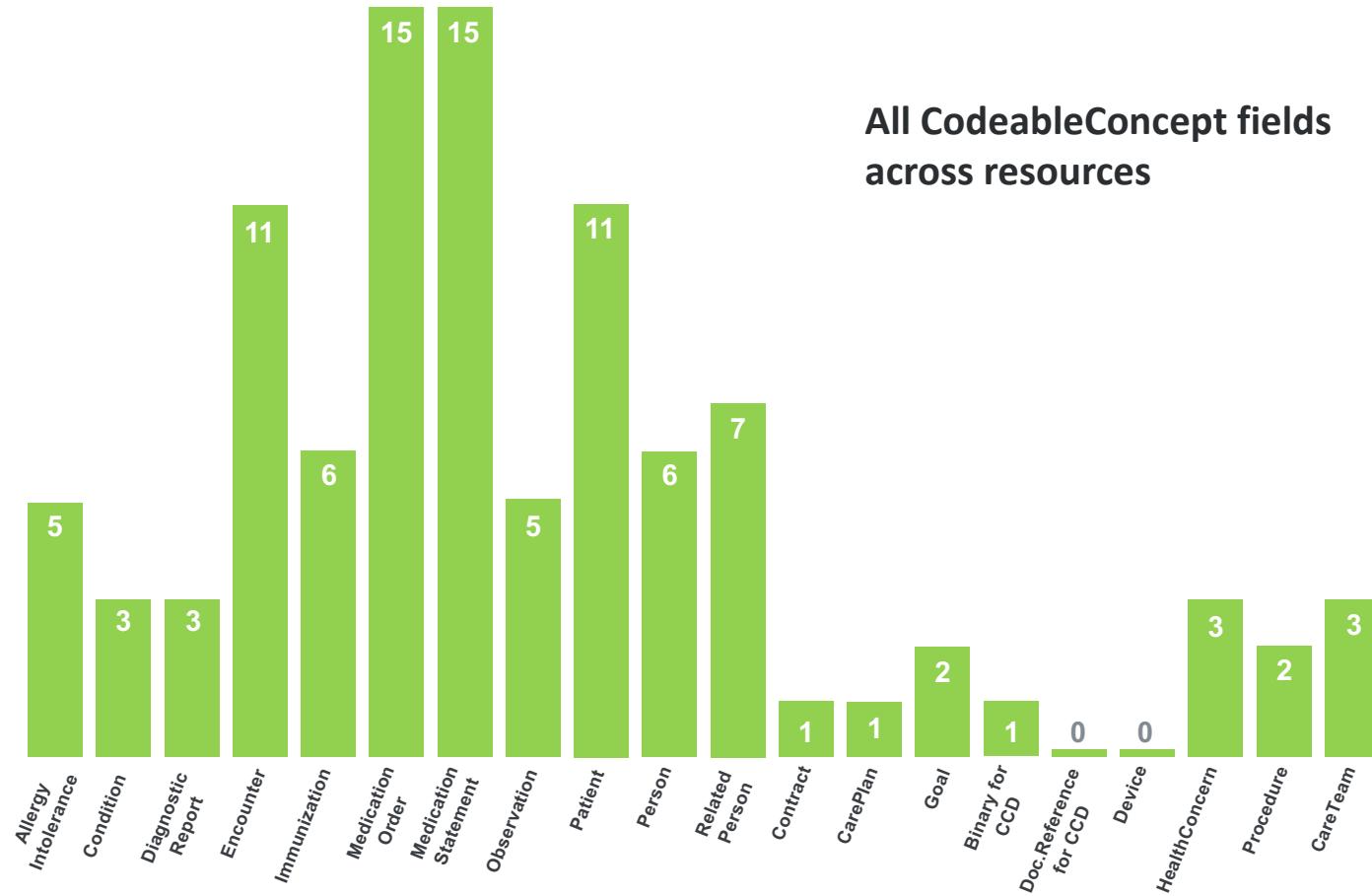
29463-7

8335-2

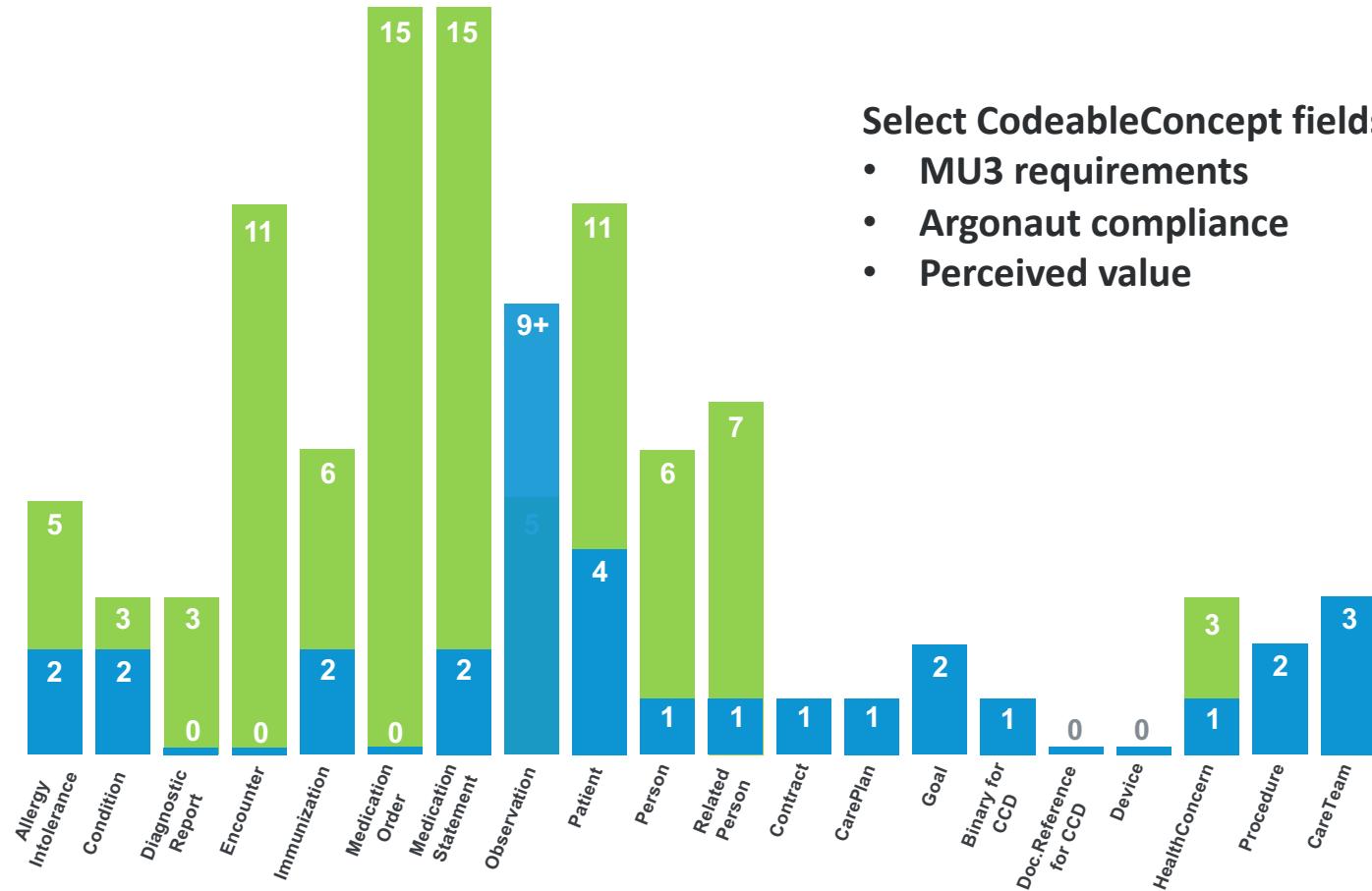
NA



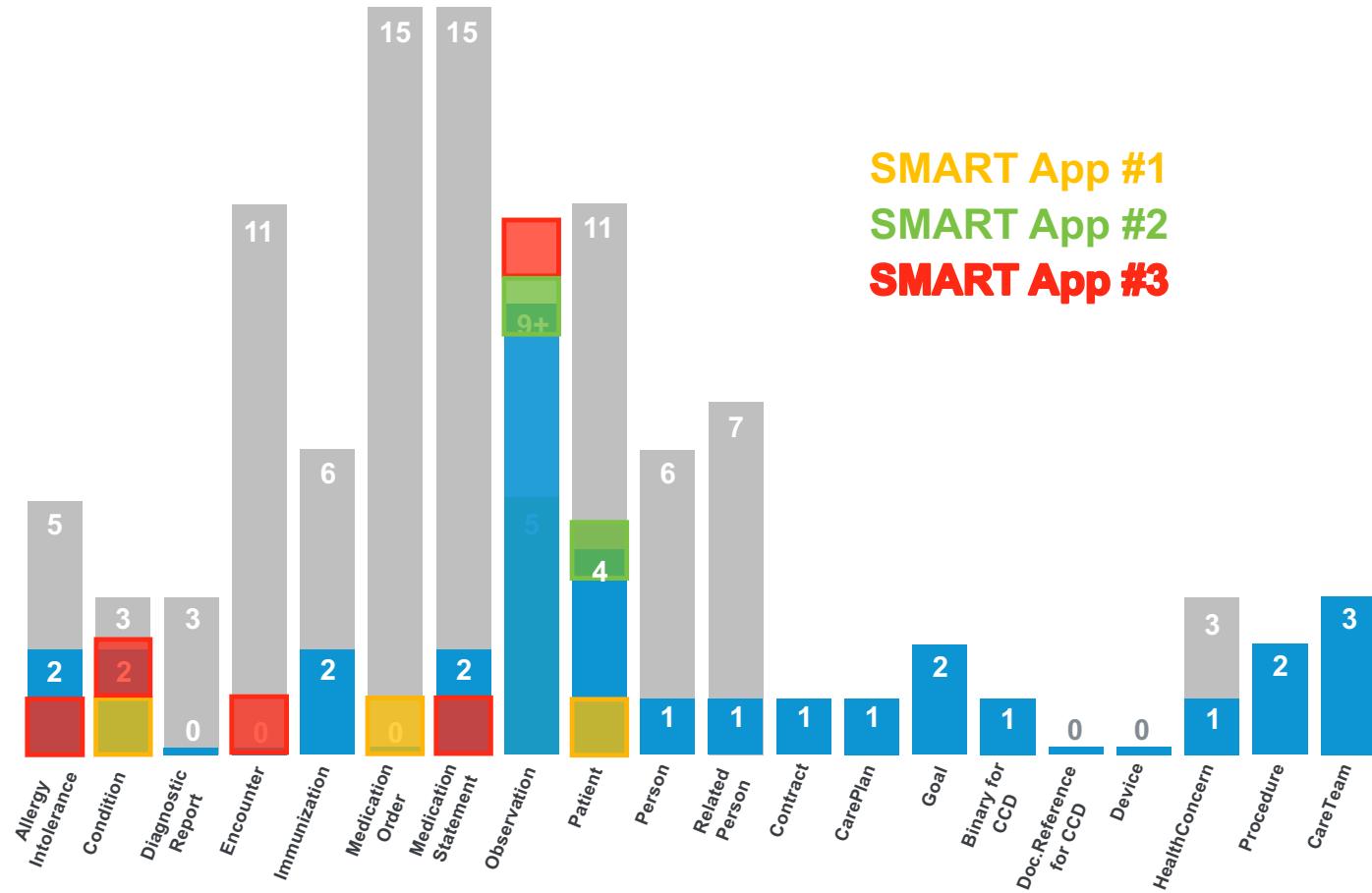
Mappings | Full Scope



Mappings | Meaningful Use



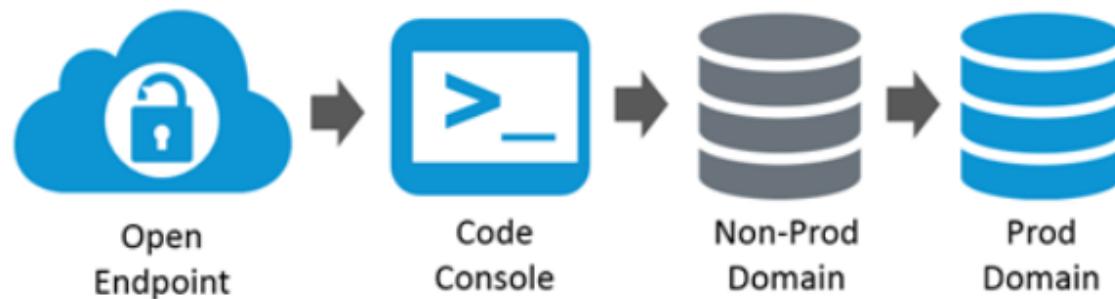
Mappings | App-Specific Mappings



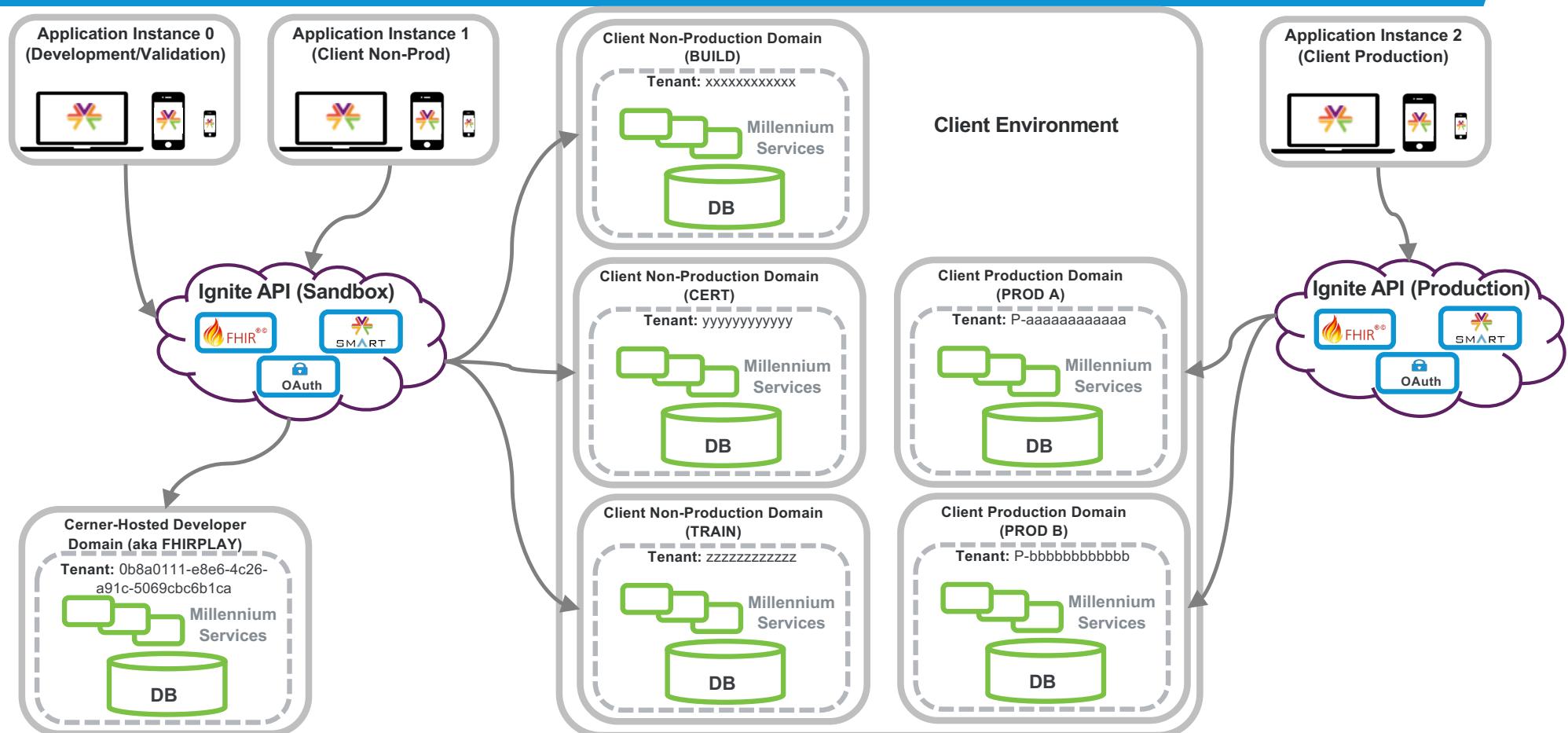
Putting It All Together

Application Development Progression (Client)

- Use the Open Sandbox connection to validate ideas
- Register and test the app in Cerner Sandbox using Code Console
- Provision app for integration testing in your non-prod domain
- Provision app for production use



SMART on FHIR Open Platform Architecture



Application Development Progression (Developer)

- Use the Open Sandbox connection to validate ideas
- Register and test the app in Cerner Sandbox using Code Console
- Join Code Developer Program
- Validate the application for use at client sites
- Market application to clients



App Validation



Support Channels

Technical Questions

- Google Group (Open):
<https://groups.google.com/forum/#!forum/cerner-fhir-developers>
- uCern Group (Cerner and Clients Only):
<https://connect.ucern.com/groups/ignite-apis-community>

Business Questions

- Contact your Engagement Leader or Client Results Executive (CRE)
- code.cerner.com developer program site

eService (Client)

If you have technical issues with your domain or you are ready to move an app into your production or non-production domain, log a service record in eService: <https://eservice.ucern.com/>

For Solution Family, select Open Development Services

For Solution, select Ignite APIs for Mill

Additional Resources

- SMART specification
 - <<http://docs.smarthealthit.org/>>
 - FHIR specification
 - <<https://www.hl7.org/fhir/dstu2/>>
 - Cerner Developer Program
 - <<http://code.cerner.com/>>
 - Cerner Developer Documentation
 - <<http://fhir.cerner.com/millennium/dstu2/>>
 - Cerner Ignite API Tutorial
 - <<http://engineering.cerner.com/smart-on-fhir-tutorial/>>
 - Code Console
 - <<https://code.cerner.com/developer/smart-on-fhir/>>
 - Developer Community Google Group
 - <<https://groups.google.com/forum/#!forum/cerner-fhir-developers>>
 - Cerner Ignite APIs Reference Pages
 - <<https://wiki.ucern.com/display/reference/Cerner+Ignite+APIs+Reference+Pages>>
 - uCern Connect Ignite APIs Community
 - <<https://connect.ucern.com/groups/ignite-apis-community>>
- 
- Client Only**

Cerner Open Developer Experience: code.cerner.com

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Welcome to code

Cerner Open Developer Experience (code) encourages innovators to build apps that advance the health care industry through improved interoperability capabilities.