VA HEALTH CARE | Defining EXCELLENCE in the 21st Century

VA Community Care
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Continuity of Veteran Care during EHR Migration and beyond:

The VISTA Data Project

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A Joint Interagency Project with the U.S. Department of Defense, Defense Health Agency

- VA-DoD Interagency Project
- Leverages DoD-developed EHR migration technology and approach
- Provides security, audit, analysis, and migration for all veteran data
- Creates Master Veteran Data Model for all veteran data
- Enables Master Veteran Data Repository for all veteran data
- Execution 2016-2018
- http://vistadataproject.info

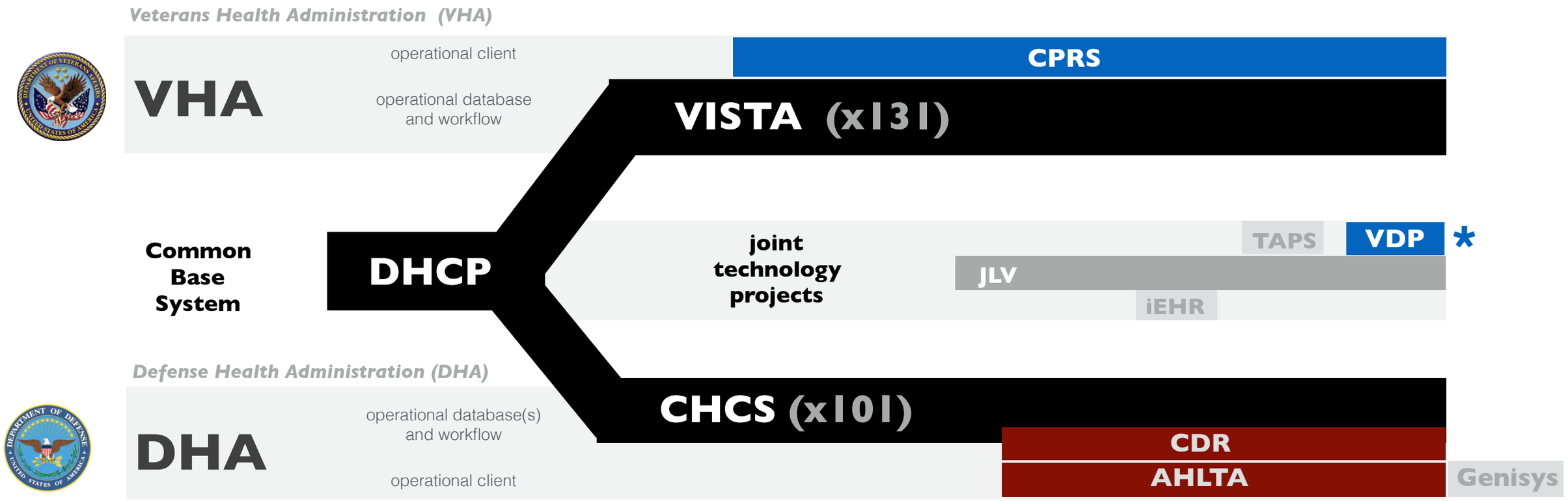
History of VHA/DHA Electronic Health Records

DHCP is the common base system

VHA: 151 hospitals; 820 clinics; 300 vet centers; + other (total 1700 care sites)
DHA: 57 hospitals; 350 clinics + other

VHA: 131 VISTA systems operational (since 1981)
DHA: 101 CHCS systems operational (since 1985)
Total: 232 DHCP-based systems across VHA-DHA

DHCP-based systems
Common technology projects
VHA-specific interface and workflow
DHA-specific interface and workflow

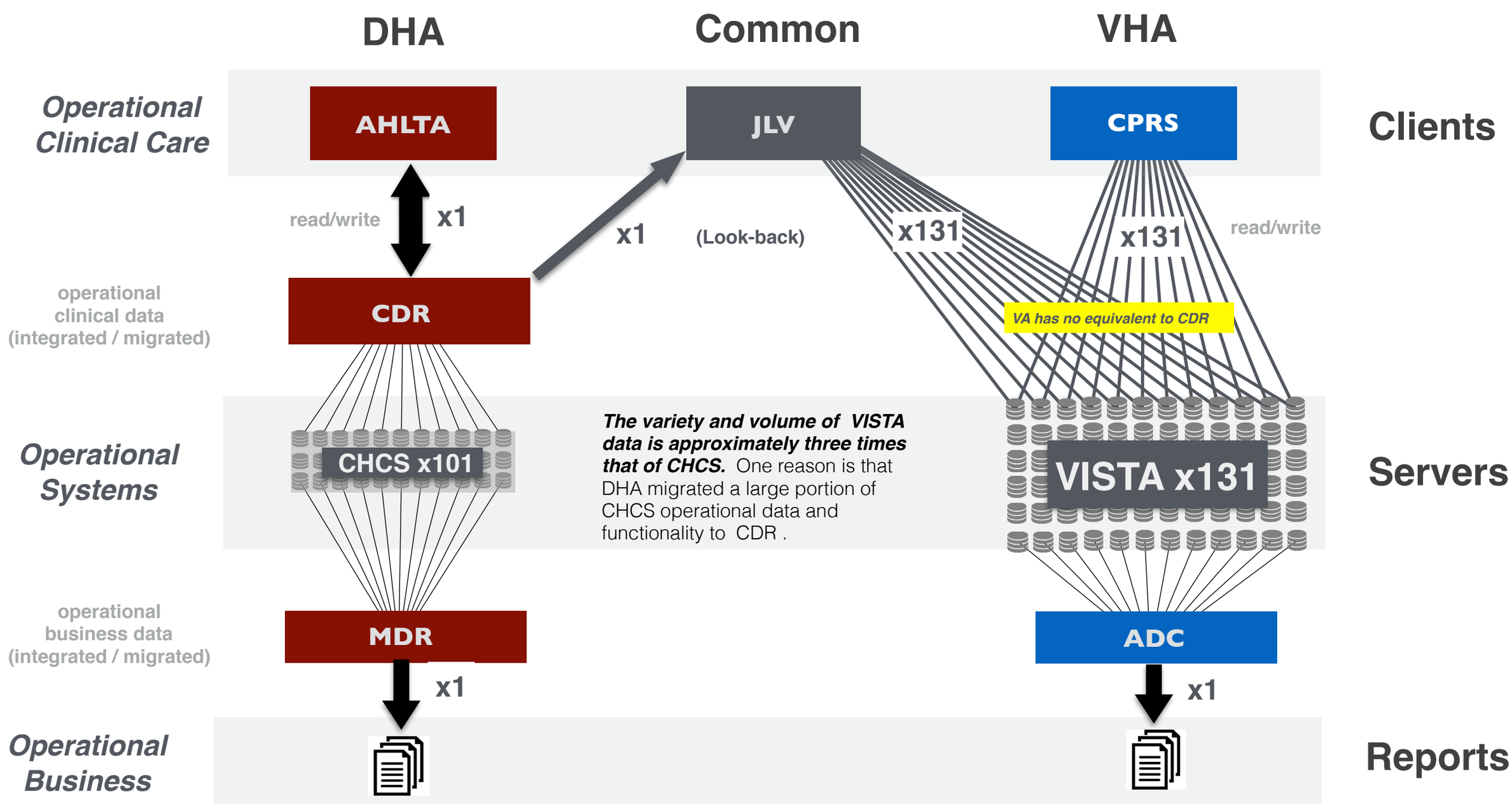


While DHCP was similar in VHA and DHA originally, it has diverged over time. The most significant fork occurred in 2004 when DHA migrated a large portion of operational data and functions from CHCS to CDR and MDR databases. Therefore the variety, volume, and function of CHCS data is now approximately one-third that of VISTA.

Note: Time scale simplified for clarity

1981 - DHCP - Decentralized Hospital Care Program - VA Fileman database and applications [VHA]
1985 - CHCS - (DHCP renamed) Composite Health Care System; modified for DHA use [Leidos (SAIC)]
1994 - VISTA - (DHCP renamed) Veterans Information Systems Technology Architecture [VHA]
1997 - CPRS - Computerized Patient Record System - graphical interface and workflow [VHA]
2004 - AHLTA/ CDR/ MDR - Armed Forces Health Longitudinal Technology Application [Northrup Grumman]
2003 - JLV - (originally Janus; renamed to JLV in 2011) [DHA-VHA]
2011 - iEHR - Integrated Electronic Health Record [SMS]
2013 - TAPS - Transition Application Plan Support [DHA-VHA]
2016 - MHS Genesis (COTS EHR - Cerner)
* **2016 - VDP - VISTA Data Project [DHA-VHA]**

Current State of VHA/DHA EHR Migration



DHA has standardized and migrated much its operational clinical and business data from CHCS into CDR, providing look-back to clinical data, allowing retirement of CHCS.

VHA has not yet decided on its long-term strategy for migration of longitudinal Veteran operational business and clinical data. There is no equivalent of a CDR in VHA. VA remains fully dependent on VISTA for all clinical and business operations.

AHLTA - User Interface
CHCS - Composite Healthcare System (All operational data)
MDR - Military Data Repository (Operational business data)
CDR - Clinical Data Repository (Operational clinical data

CPRS - User Interface
VISTA - VA Information Systems Architecture (All operational data)
ADC - Austin Data Center (Operational business data)

VA EHR migration: A Big Data Problem

Objective

VA needs to migrate from VISTA to a new EHR, while

- Providing continuity of all care and business processes
- Preserving all historical Veteran data - both clinical and business, and
- Making all historical data accessible and computable going forward

Problem

VA has 30+ years of business and clinical data contained in 131 VISTA systems, each with a specialized, unique data model.

Solution

VISTA Data Project: "Data migration follows Model migration"

- Phase I (2016-17): Make all Veteran data in all VISTA systems securely accessible, usable, and computable using a single, standardized, national Master Veteran Data Model (MVDM)
- Phase 2 (2017-18) Based on the MVDM, create a full fidelity copy of all data from all VISTA systems in a single, centralized, commercial cloud-based Master Veteran Data Repository (MVDR)

VISTA Data Project

Stepwise measurable migration of current VISTA data and applications to the Master Veteran Data Model (MVDM) while maintaining Continuity of Care

The MVDM is derived from the native as-is Veteran Data Model of all 131 VISTA Systems and describes with full fidelity all operational clinical and business data

MUMPS VISTA Interfacing

MUMPS Interfaces (x 1000s)

or

Insecure Asymmetric Opaque Legacy MUMPS Code-driven Interfaces

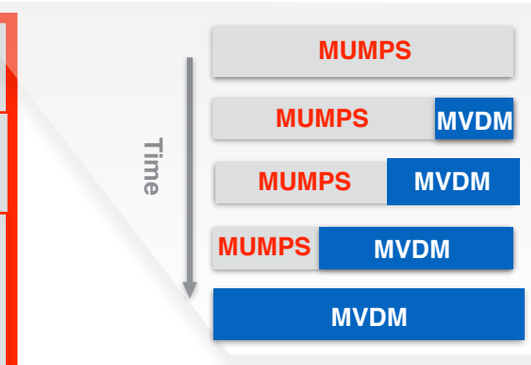
MUMPS Interfaces

MUMPS Applications

VISTA Data

MUMPS-driven Server
(maintenance, growth, and usability issues)

Stepwise, Measurable Migration



- *Measurable, Stepwise Migration from Legacy VISTA server*
- *Leverages DoD funded EHR migration tooling for VA EHR*
- *Migrates to modern, model-driven server*
- ***Maintains continuity of care***
  - *CPRS and JLV continue to run without change*
- *Enables new National Veteran Care and Business Services*
- *Enables creation of comprehensive Veteran Data Repository*

Modern, Web-standard Veterans Service Interface

Single Services Interface

Secure Symmetric Modern Model-driven Interface

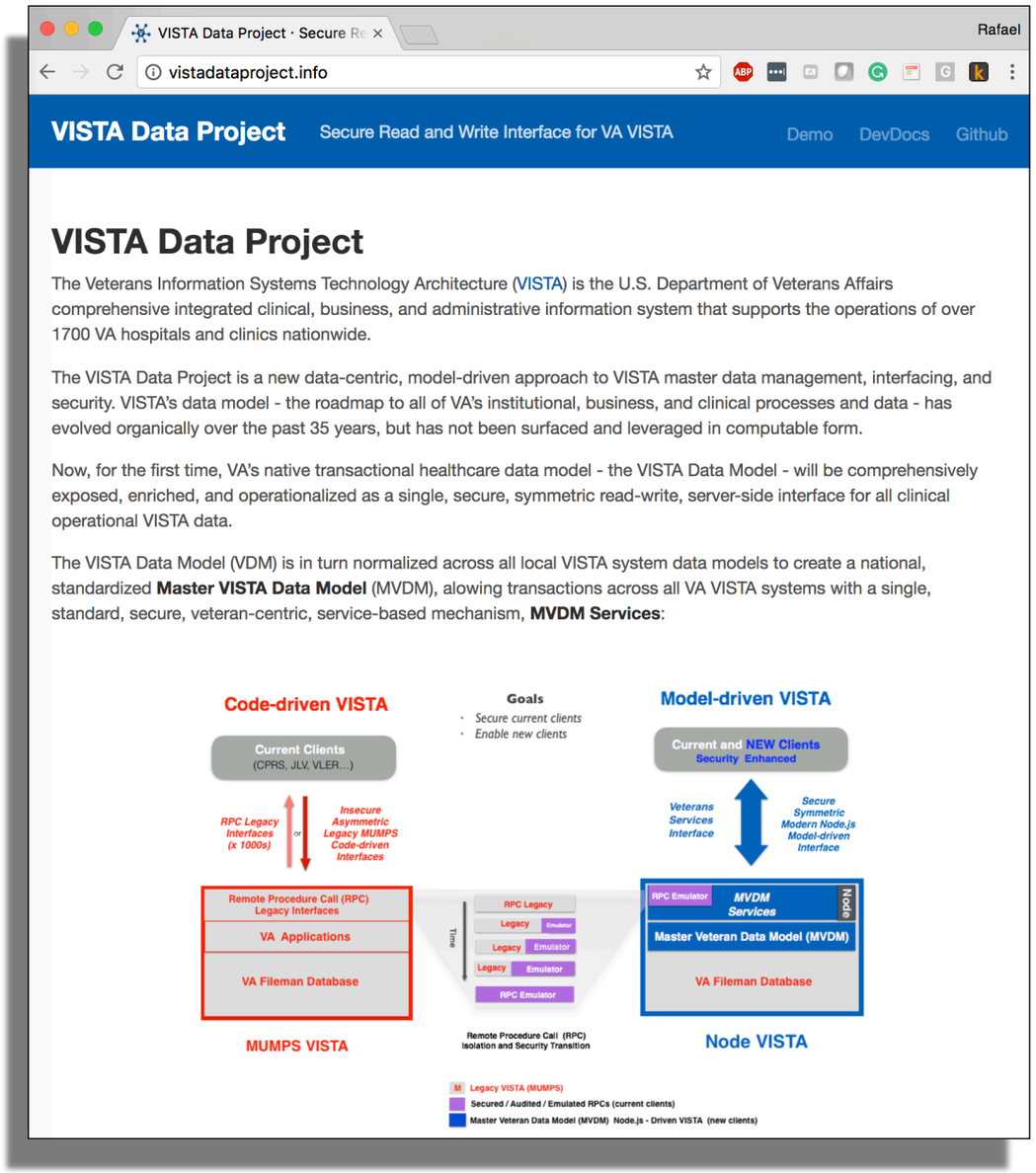
MVDM

VISTA Data

Structured Data Server
(mainstream, modular, modern, and extensible)

VISTA Data Project

Stepwise measurable migration of current VISTA data and applications to the Master Veteran Data Model (MVDM) while maintaining Continuity of Care



Website

http://vistadataproject.info

Demo

http://vistadataproject.info/demo

Docs

https://github.com/vistadataproject/documents

Contact

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Master Veteran Data Model

Enables National Veteran Clinical and Business Services Migration

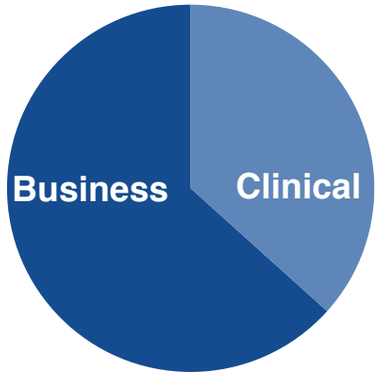
More than 50% of VISTA data is VA Business function

Content of largest 30 files in a VISTA system

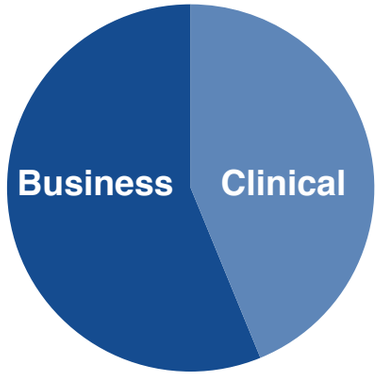
	#	File	Count
Clinical	P1	IMAGE (2005)	5,728,923
Business	P2	AR TRANSACTION (433)	5,595,597
Clinical	P3	GMRV VITAL MEASUREMENT (120.5)	5,582,099
Clinical	P4	V CPT (9000010.18)	5,533,193
Business	P5	ENROLLMENT/ELIGIBILITY UPLOAD AUDIT	5,525,976
Clinical	P6	ORDER (100)	5,243,872
Clinical	P7	TIU DOCUMENT (8925)	4,588,982
Clinical	P8	VISIT (9000010)	4,465,018
Clinical	P9	OUTPATIENT ENCOUNTER (409.68)	4,385,585
Business	P10	BCMA MEDICATION LOG (53.79)	3,901,198
Clinical	P11	V POV (9000010.07)	3,640,303
Clinical	P12	V PROVIDER (9000010.06)	3,446,623
Business	P13	ACRP TRANSMISSION HISTORY (409.77)	3,122,925
Business	P14	TRANSMITTED OUTPATIENT ENCOUNTER	2,697,388
Business	P15	IMAGE ACCESS LOG (2006.95)	2,524,259
Business	P16	PATIENT ENROLLMENT (27.11)	2,386,762
Business	P17	IB COPAY TRANSACTIONS (354.71)	2,291,380
Business	P18	BCMA REPORT REQUEST (53.69)	2,119,037
Business	P19	INTEGRATED BILLING ACTION (350)	2,065,742
Business	P20	CLAIMS TRACKING (356)	1,989,049
Business	P21	ADT/HL7 PIVOT (391.71)	1,987,001
Clinical	P22	PRESCRIPTION (52)	1,863,696
Business	P23	ORDER CHECK INSTANCES (100.05)	1,486,470
Business	P24	UNIT DOSE EXTRACT DATA (728.904)	1,475,497
Business	P25	ACCOUNTS RECEIVABLE (430)	1,466,346
Clinical	P26	V HEALTH FACTORS (9000010.23)	1,462,325
Business	P27	IVM FINANCIAL QUERY LOG (301.62)	1,439,880
Business	P28	IVM TRANSMISSION LOG (301.6)	1,285,905
Business	P29	IB BILL/CLAIMS DIAGNOSIS (362.3)	1,264,869
Business	P30	BCMA UNABLE TO SCAN LOG (53.77)	1,239,098

Total files	91,804,998
Clinical files	40,211,696
Business files	51,593,302

VISTA Packages (total 180)



VISTA Files (largest 30)

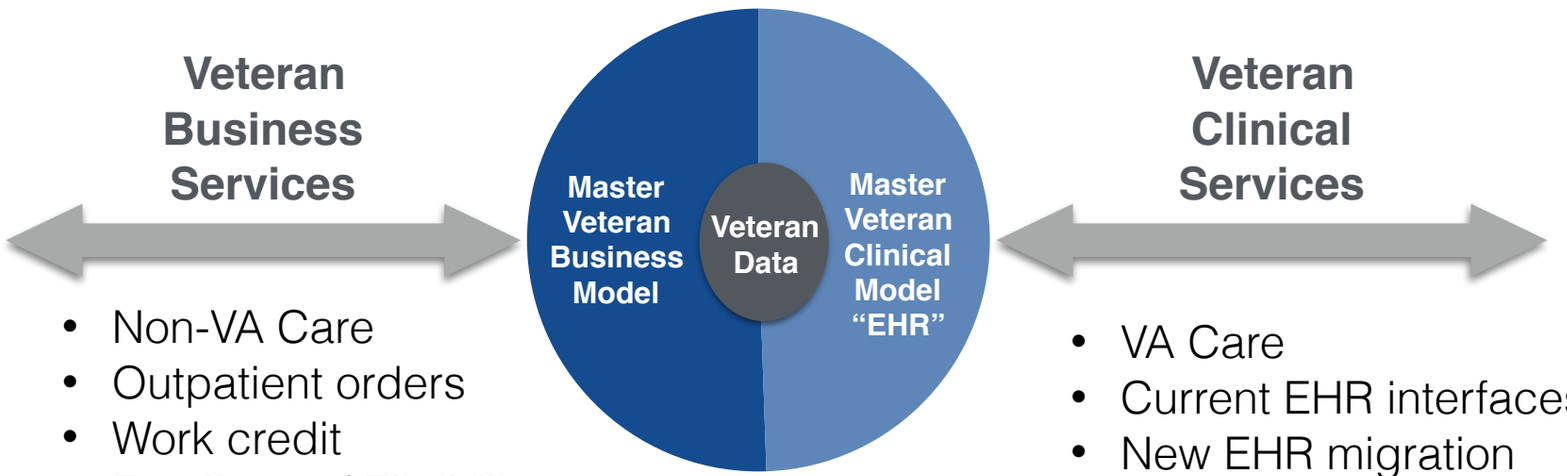


VISTA Data (>90 million)

Master Veteran Data Model

Enables National Veteran Clinical and Business Services Migration

MVDM

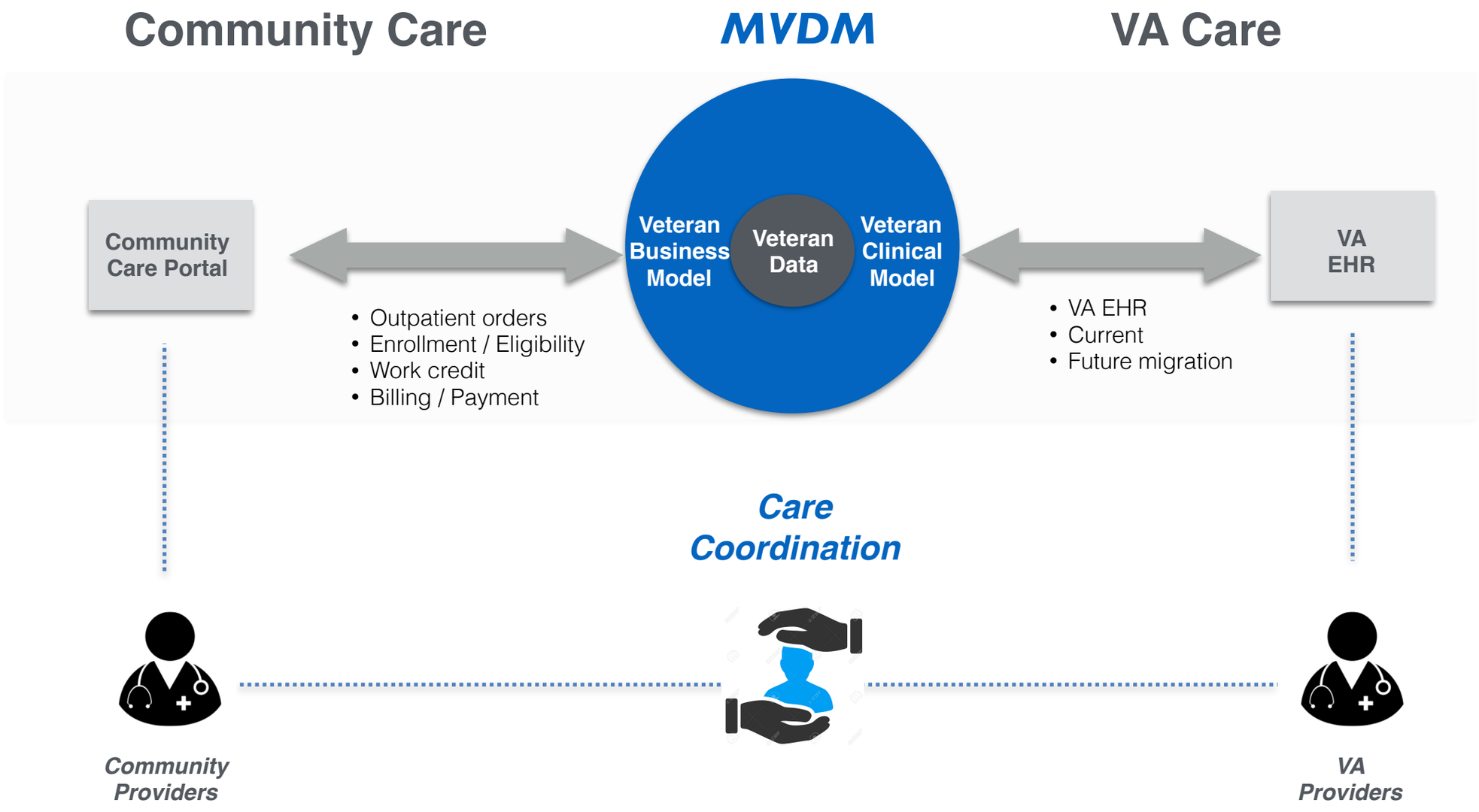


- Non-VA Care
- Outpatient orders
- Work credit
- Enrollment / Eligibility
- Billing / Payment

- VA Care
- Current EHR interfaces
- New EHR migration

Master Veteran Data Model

Enables National Veteran Clinical and Business Services Migration



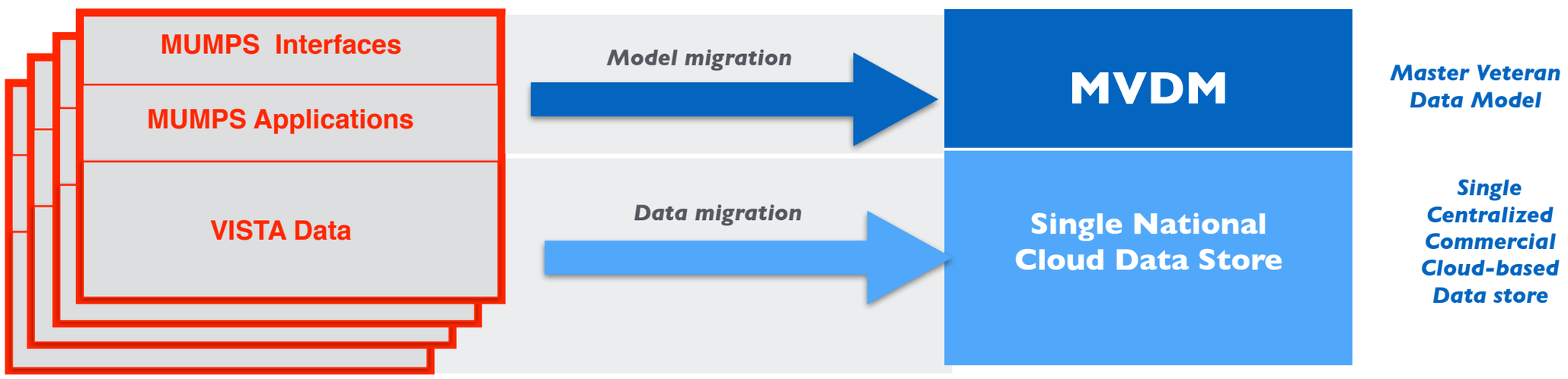
VISTA Data Project

TECHNICAL

Veteran Data Repository

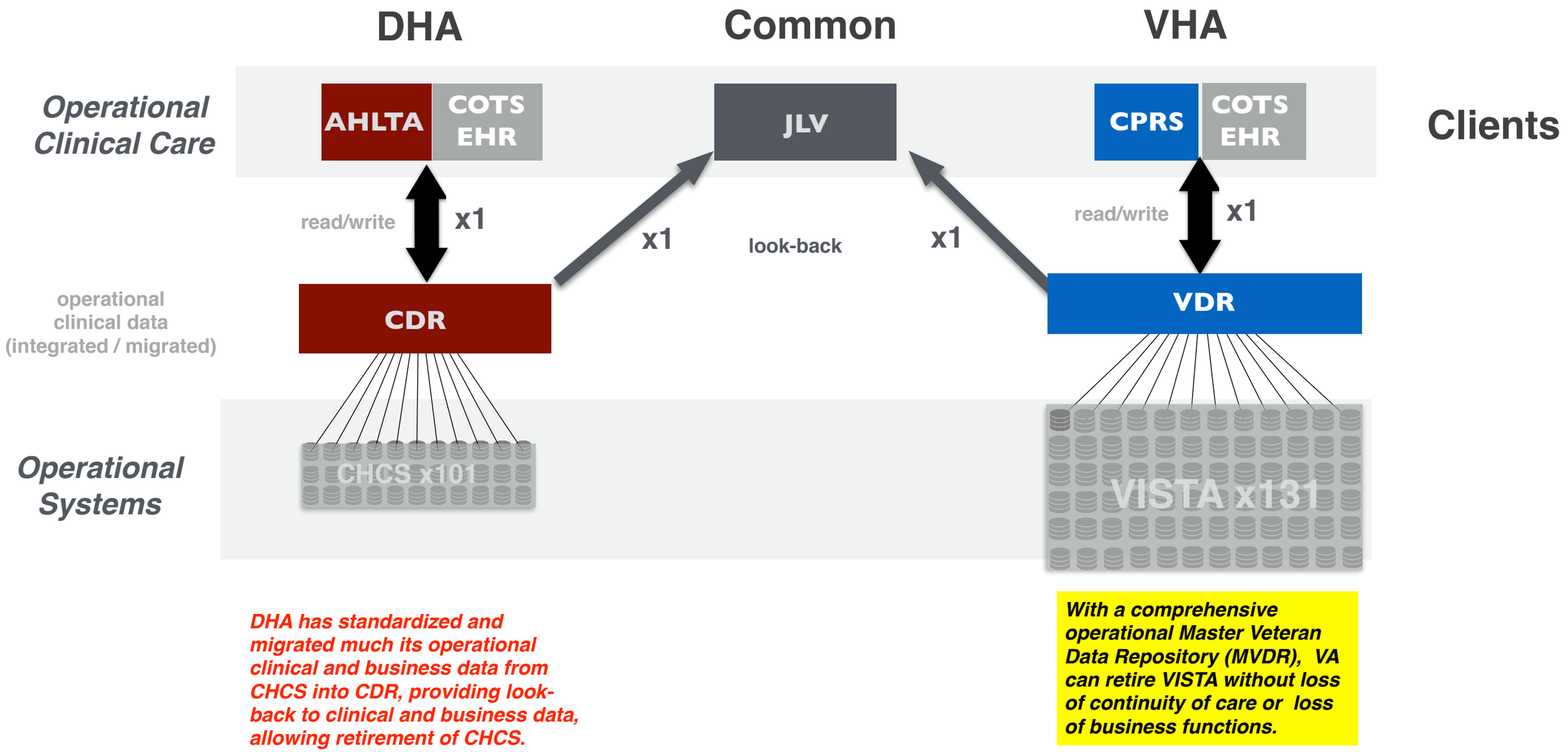
Enables National Veteran Clinical and Business Services Migration

"Data migration follows Model migration"



With a comprehensive operational Master Veteran Data Repository (MVDR), VA can retire VISTA without loss of continuity of care or loss of business functions.

Transition State of VHA-DHA EHR Migration



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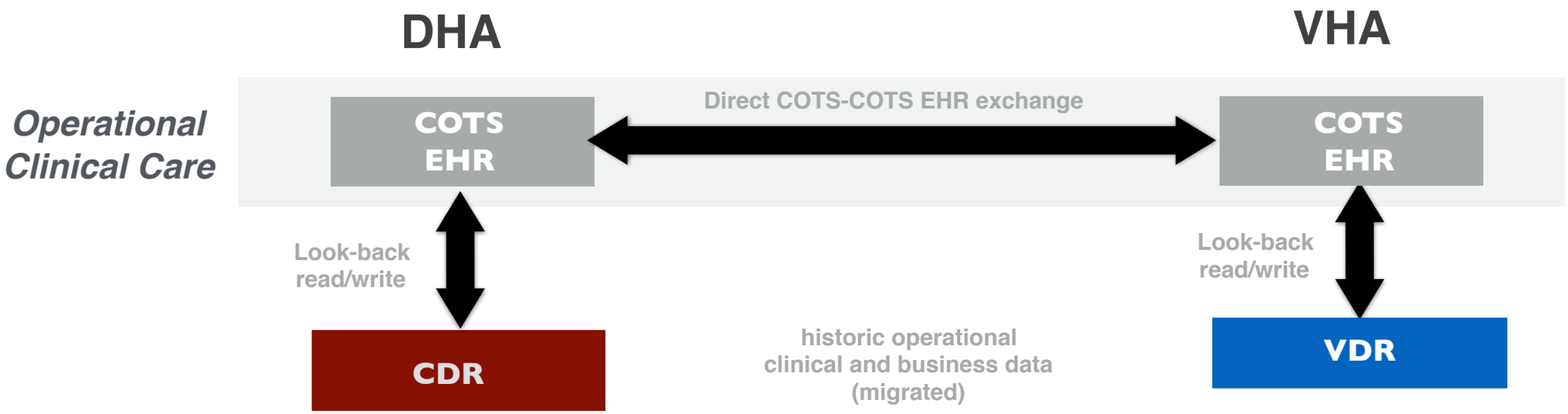
Future State of VHA-DHA EHR Migration



With a comprehensive operational Master Veteran Data Repository (MVDR), VA can retire VISTA without loss of continuity of care or loss of business functions.

VISTA Data Project

TECHNICAL

Master Veteran Data Model

Enables National Veteran Clinical and Business Services Migration

Attributes

Interface	Code-driven VISTA MUMPS RPCs (x3500)	Model-driven VISTA Master VISTA Data Model (x1)
Method	🚫 Relies on over 3500 client-specific, non-interchangeable legacy MUMPS routines 🚫 Distinct, unique routines for reading vs writing the same data 🚫 Requires extensive knowledge and experience with MUMPS and VISTA	✅ Data Model-Driven 🆕 ✅ Client-agnostic 🆕 ✅ One single, symmetric read-write mechanism for all data 🆕 ✅ Requires no knowledge or experience with VISTA internals or MUMPS.
Ease of interfacing to new clients	🚫 HARD	✅ EASY
Security	🚫 Patchy, Opaque	✅ Comprehensive, Clear
Authentication	Kernel Access/Verify	✅ SAML token
Access Control	🚫 Dependent on and specific to the legacy terminal interface Menu Options	✅ Applicable to any and all (new) interfaces ✅ Data-Centric; 🆕 ✅ Patient-Centric 🆕 ✅ Enables Attribute-Based Access Control (ABAC) 🆕
Fileman API Compliant	🚫 Unreliable, Incomplete 🚫 Variable compliance	✅ Reliable, Complete ✅ 100% Compliant
Audit	🚫 Incomplete 🚫 Bypassess Fileman auditing	✅ Comprehensive AND ✅ Patient-Centric 🆕
Unit Tested	🚫 NO 🚫 0% logic tested	✅ YES ✅ 100% logic validated
Documentation	🚫 Incomplete, inconsistent, unclear. 🚫 Requires understanding MUMPS code	✅ Complete, consistent, clear. ✅ Core is machine generated 🆕

Master Veteran Data Model

Enables National Veteran Clinical and Business Services Migration

Features

VISTA Data	Details
Access	**A single, universal, industry-standard mechanism for reading and writing *all VISTA data*.** This mechanism is unified by the read model and the write write model integrated into a single, symmetric-read-write data model (VDM), with all data in industry-standard web formats. *This overcomes the well understood shortcoming with VISTA Data Read and Write, which uses completely unique code, models, and mechanisms for reading data as distinct from writing data. Furthermore, the 20+ year old RPCs - over 3300 MUMPS routines which encapsulate all these idiosyncratic approaches (written exclusively and in lock-step with the the Delphi code of CPRS, and none of which are documented or maintained) simply cannot be relied on going forward, particularly for generic, external non-CPRS interfaces and clients.*
Integrity	**Comprehensive, automated, standardized, strict data integrity enforcement for *all VISTA data*.** *This is a major improvement over the hodgepodge of legacy, ad-hoc methods that have accumulated over the past 35 years (HL7, RPCs, MUMPS, procedural code), none of which are documented, and all of which are inconsistent, unpredictable, and highly permissive*. See also: Master Data Management
Security	**Comprehensive, industry-standard, fine-grained, data-centric security for *all VISTA data*.** Currently VISTA provides security for only a small fraction of its data, and does this through bespoke, complex, opaque, and unmaintainable methods hardwired to a legacy terminal interface and its 9000+ terminal menu options. **Data-centric, attribute-based security** is the foundation for all other security levels and technologies, because without knowledge of the data and its logical attributes, it will not be possible to provide the appropriate security measures on the data. **Through metadata enrichment of the VISTA Data Model**, VISTA will know *what categories of data it is managing* and thus allow, for the first time, comprehensive, data-centric, attribute-based security "on-the-data" for all VISTA data, permitting the secure exchange of data. See Data-Centric Security, Logical Security, Semantic Security and Attribute-Based Access Control (ABAC)