



VistA Data Extraction Framework (VDEF)

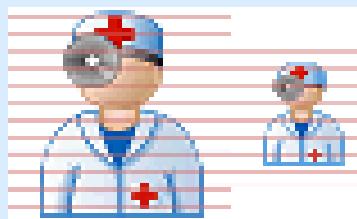


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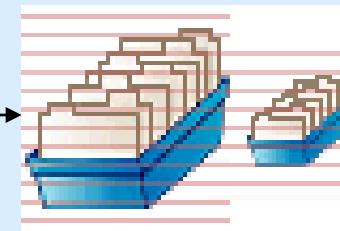
VDEF Overall Diagram

Domain Application



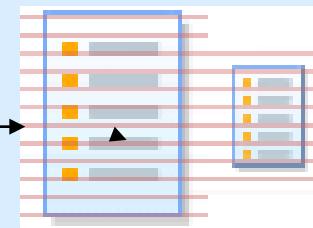
Send Trigger request

VDEF Application



Generate HL7 message

HL7 Message



Deploy HL7 message



Deliver HL7 message



Deliver HL7 message



Receiving Facility

VIE Application

HL7 Application



VDEF domain applications & Trigger request

- *Domain applications:*
 - ❖ Allergies
 - ❖ Outpatient Pharmacy
 - ❖ Vitals
- *Trigger*
 - ❖ adds entry to VDEF Request Queue (FIFO)
 - ❖ then VDEF task processes the trigger event



VDEF Activities within Messaging

- *VistA Data Extraction Framework (VDEF)*
 - ❖ Extract *LIVE* data from *VistA* database
 - ❖ Generate *HL7* message (*using HL7 v2.4 standard*)
 - ❖ Hand off *HL7* message to *HL7* application
- *HL7 Engine (v1.6)*
 - ❖ Deliver *HL7* message to *VIE*
- *VistA Interface Engine (VIE)*
 - ❖ Deliver *HL7* message to *Receiving Facility*
- *Receiving Facility - Health Data Repository system (HDR / HDR II)*
 - ❖ Parse *HL7* message and store data on target systems



VDEF's Events & Message Types

Vitals Package: GEN. MED. REC. – VITALS
ORU-R01-VTLS PATIENT VITALS

Allergy Package: ADVERSE REACTION TRACKING
ORU-R01-ALGY ALLERGY UPDATE/INSERT
ORU-R01-ADAS ALLERGY ASSESSMENT
ORU-R01-ADRA ADVERSE REACTION REPORT

Outpatient Pharmacy Package: OUTPATIENT PHARMACY
RDE-O11-PRES OP PHARM PRESCRIPTION
RDS-O13-PPAR OP PHARM PRESCRIPTION PARTIAL
RDS-O13-PREF OP PHARM PRESCRIPTION REFILL



VDEF Export VistA data

Convert VistA data into HL7 Message





VDEF Main Menu

Select Systems Manager Menu Option: VDEF VDEF Configuration and Status

- Site Site-Wide Parameters
- Req Request Queue Parameters
- ActR Activate/Inactivate Requestor
- SusR Suspend/Run Request Queue
- Cust VDEF Custodial Package Activate/Inactivate
- API VDEF Event API Activate/Inactivate
- Stat Status of VDEF components
- Sch Request Processor Schedule



VDEF – Site-Wide Parameters

Site	Site-Wide Parameters
Req	Request Queue Parameters
ActR	Activate/Inactivate Requestor
SusR	Suspend/Run Request Queue
Cust	VDEF Custodial Package Activate/Inactivate
API	VDEF Event API Activate/Inactivate
Stat	Status of VDEF components
Sch	Request Processor Schedule

Select VDEF Configuration and Status Option: SITE Site-Wide Parameters

VDEF SYSTEM: TEST.CHEYENNE.MED.VA.GOV//

VDEF MONITOR DELAY: 30S//



VDEF – Request Queue Parameters

Select VDEF Configuration and Status Option: Req Request Queue Parameters

Select Request Queue: ??
MAINTENANCE

Select Request Queue: MAINTENANCE
ARCHIVAL PARAMETER: 30D 23H 59M 59S//
CHECKED OUT TIME LIMIT: 10M//
REQUEST QUEUE WAKEUP PERIOD: 10S//



VDEF – Activate/Inactivate Requestor

Select VDEF Configuration and Status Option: ActR
Activate/Inactivate Requestor

Select Requestor: MAINTENANCE

Inactivating a requestor has a significant effect on the synchronization of VistA and remote system(s). All VDEF requests made while the requestor is inactive will be PERMANENTLY lost. Make sure you really want to turn it off.

REQUESTOR ACTIVATION FLAG: ACTIVE//



VDEF – Suspend/Run Request Queue

Site	Site-Wide Parameters
Req	Request Queue Parameters
ActR	Activate/Inactivate Requestor
SusR	Suspend/Run Request Queue
Cust	VDEF Custodial Package Activate/Inactivate
API	VDEF Event API Activate/Inactivate
Stat	Status of VDEF components
Sch	Request Processor Schedule

Select VDEF Configuration and Status Option: SusR Suspend/Run Request Queue

Select Request Queue: MAINTENANCE
SUSPENDED FLAG: RUNNING//



VDEF — VDEF Custodial Package Activate/Inactivate

Select VDEF Configuration and Status Option: Cust VDEF
Custodial Package Activate/Inactivate

Select Custodial Package: ??

Choose from:

OUTPATIENT PHARMACY

GEN. MED. REC. - VITALS

ADVERSE REACTION TRACKING

Select Custodial Package: OUTPATIENT PHARMACY PSO

Inactivating a custodial package has a significant effect on the synchronization of VistA and remote system(s). All VDEF requests for HL7 messages associated with this custodial package made while the package is inactivated will be PERMANENTLY lost. Make sure you really want to turn this custodial package off.

ACTIVATION STATUS: ACTIVE// ?

Sending messages for this package is "A"ctive or "I"nactive

Choose from:

A ACTIVE

I INACTIVE

ACTIVATION STATUS: ACTIVE//



VDEF – VDEF Event API Activate/Inactivate

Select VDEF Configuration and Status Option: API VDEF Event API Activate/Inactivate

Select VDEF API Event: ??

Choose from:

- | | | |
|---|--|---------------------|
| 1 | ORU-R01-VTLS PATIENT VITALS | Status: ACTIVE |
| | Pkg: GEN. MED. REC. - VITALS | HL7 Engine: HL7 1.6 |
| 2 | ORU-R01-ALGY ALLERGY UPDATE/INSERT | Status: ACTIVE |
| | Pkg: ADVERSE REACTION TRACKING | HL7 Engine: HL7 1.6 |
| 3 | ORU-R01-ADAS ALLERGY ASSESSMENT | Status: ACTIVE |
| | Pkg: ADVERSE REACTION TRACKING | HL7 Engine: HL7 1.6 |
| 4 | ORU-R01-ADRA ADVERSE REACTION REPORT | Status: ACTIVE |
| | Pkg: ADVERSE REACTION TRACKING | HL7 Engine: HL7 1.6 |
| 5 | RDE-011-PRES OP PHARM PRESCRIPTION | Status: ACTIVE |
| | Pkg: OUTPATIENT PHARMACY | HL7 Engine: HL7 1.6 |
| 6 | RDS-013-PPAR OP PHARM PRESCRIPTION PARTIAL | Status: ACTIVE |
| | Pkg: OUTPATIENT PHARMACY | HL7 Engine: HL7 1.6 |
| 7 | RDS-013-PREF OP PHARM PRESCRIPTION REFILL | Status: ACTIVE |
| | Pkg: OUTPATIENT PHARMACY | HL7 Engine: HL7 1.6 |

Select VDEF API Event: 5 OP PHARM PRESCRIPTION Status: ACTIVE
Pkg: OUTPATIENT PHARMACY HL7 Engine: HL7 1.6

Inactivating a VDEF API event will cause all requests for that API to be PERMANENTLY lost. Make sure you really want to turn this API event off.

API EVENT ACTIVE FLAG: ACTIVE//



VDEF – Status of VDEF Components

Select VDEF Configuration and Status Option: Stat Status of VDEF components

VDEF Status – JUN 03, 2009@19:26:52

Logical Link Status

VDEFVIE1: stopped or caught up
VDEFVIE2: stopped or caught up
VDEFVIE3: stopped or caught up

Requestor Status

MAINTENANCE: Activated Dest.: VISTA HL7 Req. Queue: MAINTENANCE

Request Processor Status

MAINTENANCE: Running
Current Task # [Proc]: 1440227 [20C008F5] Task status: Active-Running
Requests waiting for purge: 1271405 last request#: 2934699
Checked Out(98) Queued Up(>1000) Errorred Out(0)



VDEF – Request Processor Schedule

Site	Site-Wide Parameters
Req	Request Queue Parameters
ActR	Activate/Inactivate Requestor
SusR	Suspend/Run Request Queue
Cust	VDEF Custodial Package Activate/Inactivate
API	VDEF Event API Activate/Inactivate
Stat	Status of VDEF components
Sch	Request Processor Schedule

Select VDEF Configuration and Status Option: Sch Request Processor Schedule

Select Request Queue: MAINTENANCE

No Scheduling Rules currently defined for this queue

Select Entry:



HL7 – System Link Monitor

SYSTEM LINK MONITOR for CHEYENNE VAMC (T System)

NODE	MESSAGES	MESSAGES	MESSAGES	MESSAGES	DEVICE	STATE
	RECEIVED	PROCESSED	TO SEND	SENT	TYPE	
VDEFVIE1	10	10	10	10	NC	Enabled
VDEFVIE2	437	437	764	437	NC	Enabled
VDEFVIE3	620	620	620	620	NC	Enabled

Incoming filers running => 1

TaskMan running

Outgoing filers running => 1

Link Manager running

Monitor current [next job 0.1 hr]

Select a Command:

(N)EXT (B)ACKUP (A)LL LINKS (S)CREENED (V)IEWS (Q)UIT (?) HELP:



VDEF – File 579.3 VDEF Request Queue

VDEF Request Queue before HL7 message is generated:

```
^VDEFHL7(579.3,1,1,3307,0)=3307^Q^RDE^O11^^1^1^3080827.173717^^^^^5  
^VDEFHL7(579.3,1,1,3307,.05,0)=^579.311^2^2  
^VDEFHL7(579.3,1,1,3307,.05,1,0)=1^SUBTYPE=PRES  
^VDEFHL7(579.3,1,1,3307,.05,2,0)=2^IEN=1614645  
^VDEFHL7(579.3,1,1,3307,1,"B",1,1)=  
^VDEFHL7(579.3,1,1,3307,1,"B",2,2)=
```

VDEF Request Queue after HL7 message is generated:

```
^VDEFHL7(579.3,1,1,3307,0)=3307^P^RDE^O11^^1^1^3080827.173717^3080827.17392^3080  
827.17392^^44233620030^3080827.17392^^^^5  
^VDEFHL7(579.3,1,1,3307,.05,0)=^579.311^2^2  
^VDEFHL7(579.3,1,1,3307,.05,1,0)=1^SUBTYPE=PRES  
^VDEFHL7(579.3,1,1,3307,.05,2,0)=2^IEN=1614645  
^VDEFHL7(579.3,1,1,3307,1,"B",1,1)=  
^VDEFHL7(579.3,1,1,3307,1,"B",2,2)=
```



VDEF - HL7 Message Header File (File-773)

File-773 : HL7 Message Administration

```
^HLMA(33620030,0)=35387771^44233620030^O^D^^33620030^210^6776^^  
133^132^1^^^210  
^HLMA(33620030,"MSH",0)=^773.01^1^1  
^HLMA(33620030,"MSH",1,0)=MSH^~|&^HDRPRES^442~TEST.CHEYENNE.  
MED.VA.GOV~DNS^PSO VDEF IE  
SIDE^200HD~HDR.MED.VA.GOV~DNS^20080827173920-  
0500^^RDE~O11^44233620030^T^2.4^^^AL^NE^USA  
^HLMA(33620030,"P")=1
```



VDEF - HL7 Message Header File (File-773)

HL7 MESSAGE ADMINISTRATION:

NUMBER: 33620030

MESSAGE ID: 44233620030

PRIORITY: DEFERRED

LOGICAL LINK: VDEFVIE3

SUBSCRIBER PROTOCOL: PSO VDEF RDE 011 OP PHARM PRES HR

SENDING APPLICATION: HDRPRES

MESSAGE TYPE: ACK

DATE/TIME ENTERED: AUG 27, 2008@17:39:20

TRANSMISSION TYPE: OUTGOING

INITIAL MESSAGE: AUG 27, 2008@17:39:20

RECEIVING APPLICATION: PSO VDEF IE SIDE

LOGICAL LINK - IN QUEUE: VDEFVIE3

MSH:

MSH|^~\&^HDRPRES^442~TEST.CHEYENNE.MED.VA.GOV~DNS^PSO VDEF IE
SIDE^200HD~HDR.MED.VA.GOV~DNS^20080827173920-0500^^RDE~011^44233620030^T^2.4^^^AL^NE^USA|

STATUS: PENDING TRANSMISSION

MESSAGE SIZE (c): 1705



VDEF – HL7 Message Text

File-772 : HL7 Message Text

^HL(772,35387771,0)=3080827.17392^133^^0^^44235387771^^35387771^D^6777~~~~M
^HL(772,35387771,"IN",0)=^^15^15^3080827^
^HL(772,35387771,"IN",1,0)=PID^1^6661234567V666123^6661234567V666123~~~USVHA&&0363~NI~VA FACILITY
ID&200M&L|666123456~~~USSSA&&0363~SS~VA FACILITY ID&442&L|666123~~~USVHA&&0363~PI~VA FACILITY
ID&442&L|66612345~~~USVBA&&0363~PN~VA FACILITY ID&442&L~~OPPATIENT~ONE~~~L^OPMOTHER
^HL(772,35387771,"IN",2,0)=~~~~~M^19500509^M^^1111-3-SLF~~2222~1111-3~~CDC^666 ADDRESS
~"~CITY~ST~66666~"~P~"~021~CITY~ST~~~N^021^(777)777-7777~PRN~PH|(111)111-1111~ORN~CP~"~W^29^^666123456~~~3333-3-
SLF~4444~5555-5~CDC^AAAABBBA MA~~~~~"~~
^HL(772,35387771,"IN",3,0)=
^HL(772,35387771,"IN",4,0)=ORC^RE^3389378~442_52_39.3^1614645~442_52_.001^^CM~~~~20070305~20070404
~~FILL/EXPIRATION|~~~20070305~ISSUED|~~20070305~20070305~DISPENSED/LAST DISPENSED^^20070305165017-
0500~2229~OPENTER~ONE~~~V1stA200~~2453~OPORDER~ONE~D~~MD~RE~~
^HL(772,35387771,"IN",5,0)=^^442~CHEYENNE VAMWTWROC~442_52_20~5203651~CHEYENNE VAMWTWROC~NCPDP~~~~CHEYENNE
VAMC~~~4500659~ACTIVE~99VA_52_100
^HL(772,35387771,"IN",6,0)=
^HL(772,35387771,"IN",7,0)=RXE^&ONE TABLET~~~20070305~20070404~~FILL/EXPIRATION^4003067~OXYCODONE HCL 5MG /ACETAMINOPHEN 325MG
TAB~99VA_52_6~00406-0512-01~~NDC^0~~0~442_52_6^63~TAB~442_50.7_.02^ ~TAKE~442_52.0113_8|~TID~442_52.0113_7|~F CHRONIC
PAIN~442_52_114|~FOR CHRONIC
^HL(772,35387771,"IN",8,0)=PAIN~442_52_115~~~~~WINDOW^^21^^0^^66611111~OPPARM~ONE~M~~~PHARMACIST~856897 ^~~20070305165648-
0500~~~TAKE ONE TABLET BY MOUTH THREE TIMES A DAY FOR CHRONIC PAIN~~442_52_10.2 ^D7~~~~~344~OXYCODONE 5MG WTW
ACETAMINOPHEN 325MG TAB~442_50_.01
^HL(772,35387771,"IN",9,0)=
^HL(772,35387771,"IN",10,0)=RXR^1~ORAL (BY MOUTH)~442_52.0113_6
^HL(772,35387771,"IN",11,0)=
^HL(772,35387771,"IN",12,0)=FT1^1~~~20070305~~CG^893~OXYCODONE/ACETAMINOPHEN~442_52_39.2~~~~~0.0338~~~~~OPT
SC~~6666~OPPROVIDER~ONE~~~442_52_38
^HL(772,35387771,"IN",13,0)=
^HL(772,35387771,"IN",14,0)=OBX^1^CE^WAS THE PATIENT COUNSELED~~4500630~NO~99VA_52_41~~~~~F
^HL(772,35387771,"IN",15,0)=
^HL(772,35387771,"P")=3^3080827.17392
"S")=1548^1



VDEF – HL7 Message Text

HL7 MESSAGE TEXT

NUMBER: 35387771

SERVER APPLICATION: HDRPRES

MESSAGE ID: 44235387771

PRIORITY: DEFERRED

RELATED EVENT PROTOCOL: PSO VDEF RDE 011 OP PHARM PRES VS

MESSAGE TYPE: SINGLE MESSAGE

MESSAGE TEXT:

PID^1^6661234567V666123^6661234567V666123~~~USVHA&&0363~NI~VA FACILITY ID&200M&L|666123456~~~USSA&&0363~SS~VA FACILITY ID&442&L|666123~~~USVHA&&0363~PI~VA FACILITY ID&442&L|66612345~~~USVBA&&0363~PN~VA FACILITY ID&442&L~^OPPATIENT~ONE~~~~~L~OPMOTHER
~~~~~M^19500509^M^^1111-3~SLF~~2222~1111-3~~CDC^666 ADDRESS ~""~CITY~ST~66666~""~P~""~021|~~CITY~ST~~~N^021^(777)777-  
7777~PRN~PH|(111)111-1111~ORN~CP^"~W^29^666123456~~~3333-3-SLF~~4444~5555-5~~CDC^AAAABBBB MA~~~~~"~  
ORC^RE^3389378~442\_52\_39.3^1614645~442\_52\_.001^CM~~~20070305~20070404~~FILL/EXPIRATION|~~~20070305~~ISSUED|~~~20070305~20070  
305~DISPENSED/LAST DISPENSED^20070305165017-  
0500~2229~OPENTER~ONE~~~~~Vista200^~2453~OPORDER~ONE~D~~~MD~RE~~~~~442~CHEYENNE VAM~WTWROC~442\_52\_20~5203651~CHEYENNE  
VAM~WTWROC~NCPD~P^~CHEYENNE VAM~C~4500659~ACTIVE~99VA\_52\_100  
RXE^&ONE TABLET~~~20070305~20070404~~FILL/EXPIRATION^4003067~OXYCODONE HCL 5MG /ACETAMINOPHEN 325MG TAB~99VA\_52\_6~00406-0512-  
01~NDC^0~0~442\_52\_6^63~TAB~442\_50.7\_.02^ ~TAKE~442\_52.0113\_8|~TID~442\_52.0113\_7|~F CHRONIC PAIN~442\_52\_114|~FOR CHRONIC  
PAIN~442\_52\_115~~~~~WINDOW^~21~^66611111~OPPARM~ONE~M~~~PHARMACIST^856897 ^~20070305165648~0500~~~TAKE ONE TABLET BY  
MOUTH THREE TIMES A DAY FOR CHRONIC PAIN~442\_52\_10.2 ^D7~~~~~344~OXYCODONE 5MG WTW ACETAMINOPHEN 325MG TAB~442\_50\_.01  
RXR^1~ORAL (BY MOUTH)~442\_52.0113\_6  
FT1^1~~~20070305~~CG^893~OXYCODONE/ACETAMINOPHEN~442\_52\_39.2~~~~~0.0338~~~~~OPT SC^~6666~OPPROVIDER~ONE~~~~~442\_52\_38  
OBX^1~CE^WAS THE PATIENT COUNSELED^~4500630~NO~99VA\_52\_41~~~~~F

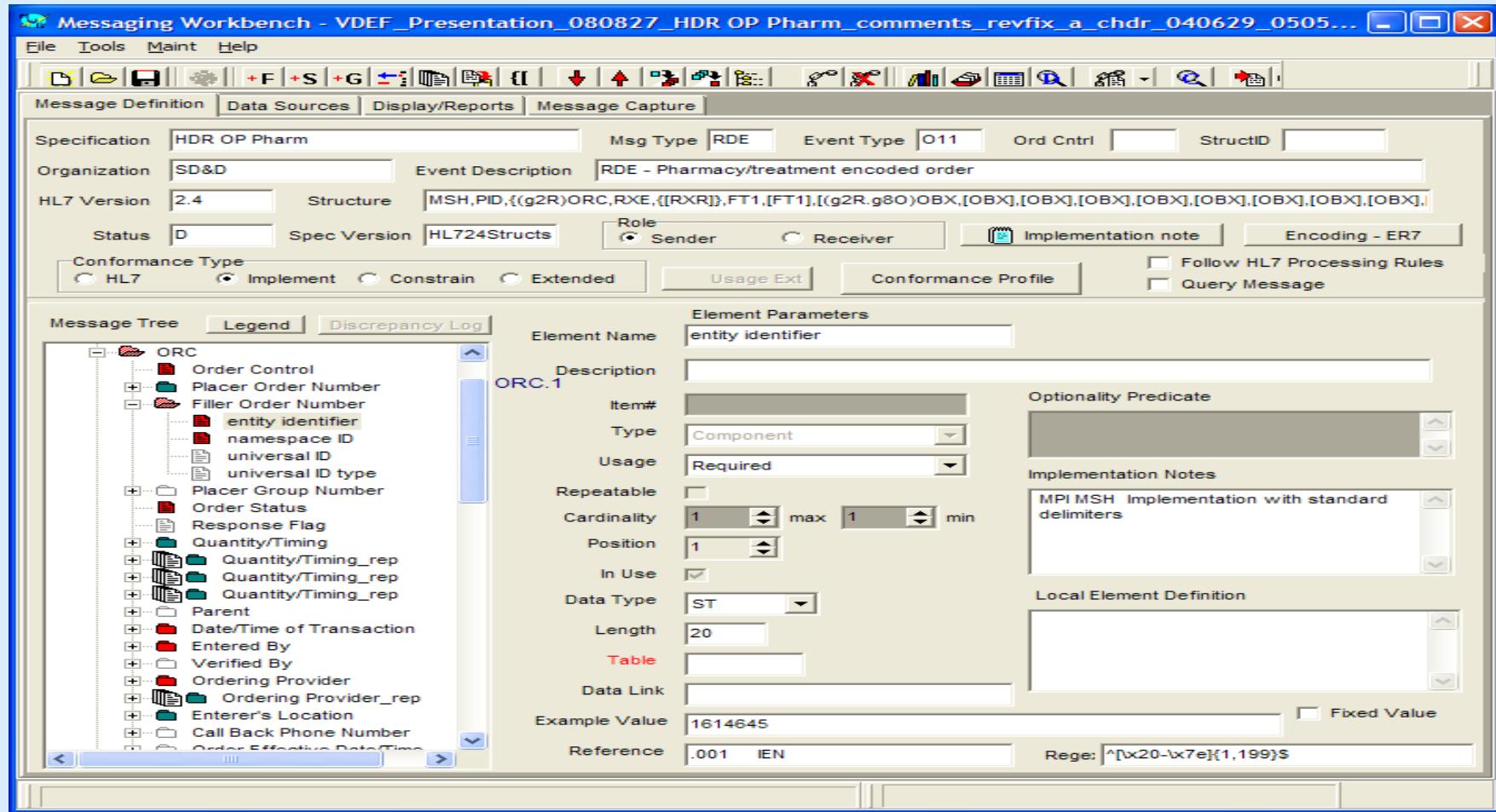
STATUS: SUCCESSFULLY COMPLETED

DATE/TIME PROCESSED: AUG 27, 2008@17:39:20

NO. OF CHARACTERS IN MESSAGE: 1548      NO. OF EVENTS IN MESSAGE: 1



# VDEF – Messaging Work Bench





# VDEF – Error Messages

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## ■ Error Message in VDEF File-579.3:

^VDEFHL7(579.3,1,1,2190679,0)=2190679^E^ORU^R01^^1^1^3080605.114245^3080610.114852~~~~~1  
^VDEFHL7(579.3,1,1,2190679,.05,0)=^579.311^2^2  
^VDEFHL7(579.3,1,1,2190679,.05,1,0)=1^SUBTYPE=VTLS  
^VDEFHL7(579.3,1,1,2190679,.05,2,0)=2^IEN=10515224  
^VDEFHL7(579.3,1,1,2190679,1,"B",1,1)=  
^VDEFHL7(579.3,1,1,2190679,1,"B",2,2)=  
^VDEFHL7(579.3,1,1,2190679,"ERRMSG")=Invalid data in file GMR(120.5) for IEN 10515224

## ■ Examples of VDEF Alerts in FORUM:

- ❖ RECORD <IEN> IN QUEUE <QUEUE NAME> HUNG IN CHECKED OUT STATUS.  
*Reason: IEN in VDEF REQUEST QUEUE has been in the Checked Out status longer than the allowed time period.*
- ❖ VDEF HAS REQUEUED CHECKED OUT RECORDS. NO ACTION NEEDED.  
*Reason: VDEF queue process has re-queued one or more requests that were hung in the Checked Out status*
- ❖ VDEF HAS REQUEUED ERRORED OUT RECORDS. NO ACTION NEEDED.  
*Reason: VDEF queue process has re-queued one or more requests that were in the Error Out status*



# VDEF - Advantages

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- *Standardize HL7 Messages*
- *Reuse code and API calls*
- *Reuse Message Segments and Fields*
- *Simplify regeneration of HL7 message if needed*
- *Verify data before HL7 message is generated*
- *Generate HL7 message from LIVE data that will not duplicate or overwrite previous HL7 message*
- *Monitor HL7 message generation process*
- *Document individual HL7 field in Messaging Work Bench*
- *Provide VDEF Alerts*
- *And much more . . .*



# VDEF – Job Requirement :

## Decode VistA data into HL7 message





# VDEF Application

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- *Questions ??*